# THE BUILDER

*A RECORD OF ARCHITECTURE AND CONSTRUCTION.*

WITH WHICH IS INCORPORATED THE "BRITISH ARCHITECT."

VOL. CXVIII.—No. 4027. APRIL 9, 1920.

## COPYRIGHT AND ARCHITECTURAL DESIGNS.

THERE are some points in the Copyright Act, 1911, which deserve attention. The Act is one of considerable complication, and, so far as we are aware, no decisions relating to architectural matters have as yet been given by the Courts, so any observations upon the effect of the Act must be diffidently tendered. One important innovation in the Act is that protection is afforded for the first time to "Architectural Works of Art," which are defined in section 35 as "Any building or structure having an artistic character or design in respect of such character or design, or any model for such building or structure, provided that the protection afforded by this Act shall be confined to the artistic character and design, and shall not extend to processes or methods of construction." To this definition must be added the qualification that the work must be original, for the Act only applies to "original" work (see section 1, subsection (1). The word original in the statute governs the whole subject of legislation, but this was not the case under the Literary Copyright Act, 1842, and it, therefore, remains to be seen whether the Courts will construe it more strictly. One of the leading cases on "originality" is Walter *v.* Lane (1900 A.C. 539), a case which concerned the reports of certain speeches and which has been relied upon as showing the degree of originality required in a production, but it must be noted that although the Court of Appeal in that case refused an injunction because "an accurate report is not an original composition," the House of Lords reversed that decision on the ground that the word "original" did not occur in that connection in the statute. This is no longer the case, as we have stated above. Probably originality will be conceded to any independently conceived design which is not a mere copy, but for the reasons above stated, too great reliance must not be placed upon decisions given under the former Act.

Under section 5 (1) "The author of a work shall be the first owner of the copyright therein," which apparently would mean, in the case of a building or structure, the designer of it. As to the remedies for breach of copyright, section 9 provides that "where the construction of a building or other structure which infringes, or which if completed would infringe, the copyright in some other work has been commenced, the owner of the copyright shall not be entitled to obtain an injunction or interdict to restrain the construction of such building or structure or to order its demolition"; thus, the remedy must be damages. This copyright of the actual structure is all new ground, and questions may arise in connection with it. For instance, what is intended by "artistic character or design"? as well as the familiar point under various Acts of Parliament as to what is a "building or structure"? though this latter question is limited by the requirement of the Act that the building or structure shall have artistic character or design.

As regards architects' plans and sketches, how has the Act of 1911 affected the law as to them? In the first place the statute has set at rest one point which sometimes involved doubt, as by section 31 it has abrogated all common law rights. As regards statutory rights, the copyright in architects' drawings and sketches was treated as being governed by the Fine Arts Copyright Act, 1862, but the material sections of that Act have been repealed by this consolidating Act of 1911 and, therefore, the provisions of the latter Act now govern the subject. The definitions in the Act leave something to be desired in the way of clearness, as the only two heads under which architects' plans and sketches can fall are "literary work" or "artistic work." "Literary work" is defined as including "maps, charts, plans, tables and compilations"; "artistic work," as including "works of painting, drawing, sculpture and artistic craftsmanship and architectural works of art and engravings and photographs." The expression "architectural works of art," has, however, been given a further and narrower definition, as we have shown above, confining it to the actual building or structure. Whether it was intended to cut down the effect of the words as used in the definition of "work of art," we cannot say. We believe the word used in the Fine Arts Copyright Act, under which architects' plans and sketches were included, was "drawing," so it may be assumed that they will fall under "artistic work" in the Act of 1911, but so far as the Act is concerned it appears that the main difference it would make, were plans to be included in "literary work," would be that under section 17 in the case of posthumous publication a longer duration is granted than in the case of artistic "works"—the fifty years running from the publication. "Artistic work" is not included in this section.

Under section 5 (1) the architect, as author of the work, will be the first owner of the copyright, but it may be noted that under paragraph (b) of this subsection, where the author was in the employment of some other person under a contract of service or apprenticeship, and the work was made in the course of his employment by that person, in the absence of any agreement to the contrary the employer will be the first owner of the copyright. Where the author of an "artistic work" is not the owner of the copyright, section 2, subsection (1) (ii) provides that the use by the author of any "sketch, plan or model made by him for the purpose of the work shall not constitute an infringement of copyright provided he does not thereby repeat or imitate the main design of the work." These two subsections have this bearing on the position of the architect: ordinarily, he will be the owner of the copyright in the plans, but if he assigns the copyright then his position will be that he must not repeat or imitate the main design.

One other point may be noticed in this very brief outline of some of the provisions of the Act. Under the Fine Arts Copyright Act, registration was required to come fully within the protection of that Act, but under the present law registration is unnecessary, nor has the copyright especially to be reserved and, therefore, special care should be taken in using and publishing drawings. Under section 1, subsection 2, "Copyright means the sole right to produce or reproduce the work or any substantial part thereof in any form whatever . . . and if the work is unpublished to publish the work or any substantial part thereof," and by section 2, "Copyright in a work shall be deemed to be infringed by any person who without the consent of the owner of the copyright does anything the sole right to do which is by this Act conferred on the owner of the copyright."

There are certain exceptions to this, amongst which we may instance under section 2, subsection (1) paragraph (iii) "The making or publishing of paintings, drawings, engravings, or photographs of a work of sculpture, or artistic craftsmanship, if permanently situated in a public place or building, or the making or publishing of paintings, drawings, engravings or photographs (which are not in the nature of architectural drawings or plans) of any architectural work of art." Under section 1 (3) "publication" in relation to any work means "the issue of copies to the public, and does not include . . . the exhibition in public of an artistic work or the construction of an architectural work of art, but (*sic*) for the purposes of this provision the issue of photographs and engravings of works of sculpture and architectural works of art shall not be deemed to be publication of such works." These two sections appear difficult to reconcile.

The use of plans for any purpose for which they were made would, of course, be an infringement of copyright if unauthorised, but supposing they are used for an incidental purpose? For instance, supposing an architect's plans were used in connection with some other invention merely to illustrate the adaptation of that system or invention? If copies were issued to the public in any sense it would appear that this would be deemed a breach of copyright. In this connection it is particularly to be observed that under section 2, subsection (1) (iii) the exception of making or publishing of paintings, drawings, engravings or photographs of any architectural work of art expressly excludes architectural drawings or plans, so their publication by any process would appear to constitute an infringement unless by consent of the owner of the copyright.

Enough has been said to show that there are many points involving obscurity under the Act, some of which will, no doubt, in course of time be submitted to the Courts for decision.

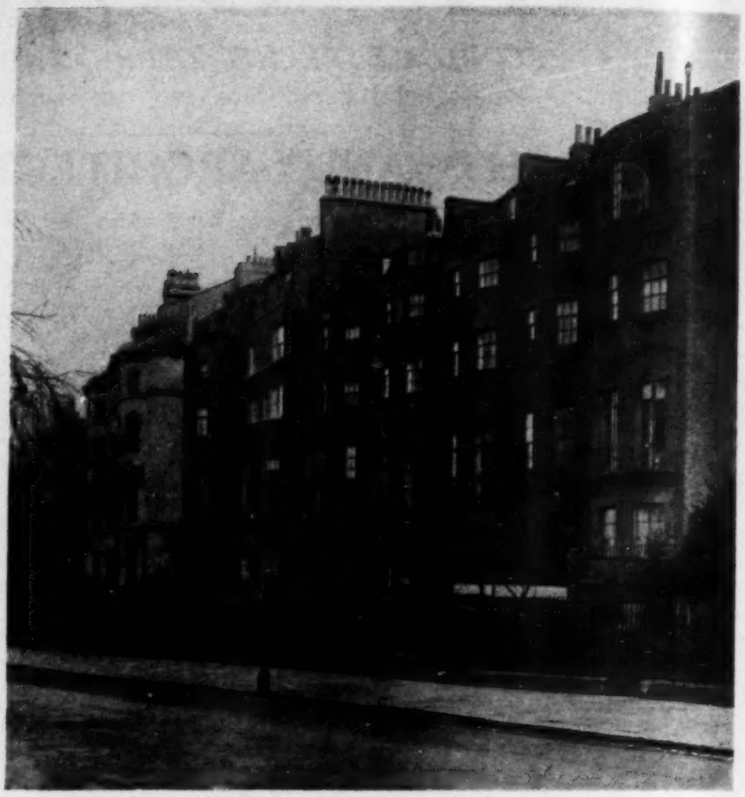
# NOTES.

**Mr. Ernest Newton, C.B.E.**

In the list of honours for services rendered in connection with the war, we imagine a good deal of surprise will be felt amongst all those who have realised what he did that Mr. Ernest Newton receives so poor a recognition. When so long a list of honours was made out, there must surely have been some misapprehension of the amount and quality of work done by Mr. Newton and his representative position amongst architects.

**Sir James Carmichael.**

We regret to hear that Sir James Carmichael has been obliged, upon medical advice, to take three months' complete rest. It is not surprising that Sir James has felt the severe strain which his work as Director General of Housing has entailed, and we are informed that he will not be in attendance at the Ministry of Health for three months. The Housing Department has now approved tenders for 90,000 houses; and it is, therefore, possible for Sir James to take the temporary respite which doctors' orders have rendered imperative.



Old Houses facing St. James's Park.

**The Southport School Competition**

A correspondent writes, under the *nom de plume* of "Nerves," complaining of the delay in announcing the result of the recent Southport School Competition, the designs for which were deposited on February 10. "It must be a very complicated problem," he says, "that the assessor could not deal with and report on in two or three weeks." We happen to know that there is very good reason for the delay, which, we also know, will not last much longer.

**Architectural Result of High Buildings.**

A protest against the erection of very high buildings in London by Mr. Andrew Taylor, late Chairman of the Improvements Committee of the L.C.C., is worth quoting here apart from his other remarks in the discussion at the R.I.B.A. He said he was frankly opposed to the erection of higher buildings, which would not add to the beauty of London. It was the duty of every Londoner to consider the problem very carefully. As regards the artistic side of the question, he had been impressed by some of the spires in New York, which, flanked by tall buildings, were completely destroyed from the artistic point of view. The spire of a church in Maddison-square was dominated by a building which adjoined it and rose to a height of 100 feet above it. There was no more beautiful sight than a view of the City of London from the river near Westminster. There was a certain symmetry and proportion of the buildings, punctuated and dotted with towers and spires, and dominated by the great swelling dome of St. Paul's, which formed a very beautiful picture, but it would be spoilt by the introduction of towers 200 ft. high. Put one alongside Bow Church, for instance, and imagine the result!

Old Houses facing Hyde Park.

**The Place for High Buildings.**

Bearing on the same aspect of the question we may quote here the remarks of Mr. Solomon J. Solomon, R.A., who said that the painter's point of view did not differ

from that of the architect. It would be a great pity to rob London of its small share of sunlight, and any raising of the general level of the skyline would have a depressing effect. A depressing effect would result if buildings of more than 12 stories were erected indiscriminately, but there were places where a well-chosen high building would add to the architectural effect, which was given here and there by cathedrals. Such buildings, however, would have to be on the south side of parks or the river, so that the shadow would not fall on the surrounding buildings. If moderately high houses were erected on the south side of the Thames, it would, perhaps, encourage the inhabitants to use the river as a highway, and thus to some extent relieve the transport problem.

**Height and Light.** What Professor Beresford Pite had to say was also very much to the point. It had to be considered, he said, that if people were prepared to pay high rents to live on the 30th floor, there were 29 stories below which would not have the same amenities. Were high buildings to be constructed with only external lighting, and no internal areas? The idea was pestilential; such buildings could not be built, and if they were they would be condemned by the sanitary authorities. The statistics of disease in districts where buildings were high were alarming when compared with districts where buildings were low. What was wanted was an alleviation in the height of commercial buildings, and in no other way should the height of buildings in London be altered, in the interests of architecture or anything else.

**Cleaning London Facades.** An observant Londoner upon arrival in Paris is at once impressed both with the clean appearance of the buildings and the untidiness of the streets in comparison with his own city. The former condition is very largely the result of an excellent regulation which compels two *arrondissements* to be thoroughly cleaned every year, the whole city being thus treated in rotation. Although no such regulation obtains in London, it is becoming an ever more common sight to see some large building undergoing a treatment of steam or hand scrubbing. The appearance of Northumberland-avenue is just now being vastly improved by reason of the removal of a deposit—the accumulation of many years—of soot and dirt from one of its largest buildings. But although the appearance of many buildings is undoubtedly improved by such a process, the rich tone which the west ends of our churches acquire in the fullness of time by their constant exposure to the driving rain, with the prevailing westerly wind, is a quality which should be most jealously and carefully preserved.

**The Artists' Quarter.** Our suggestion that there might be a better place as an artists' centre than Chelsea has, naturally enough, roused some amusing protest. We were sure the charm of antiquity had gathered round Chelsea, but we had no idea that at Chelsea "you have an atmosphere of calm and open spaces—much quieter than the country." But as this is told us by "a girl in a fur coat," we ought to be impressed. We have heard of people who don't care about a garden! and are not surprised that "a young man in a blue collar which matched his eyes" says "the great charm about Chelsea is that right in the middle of it is a main road full of traffic and motor-omnibuses." To some artists art is a very serious matter, to others it is a lightsome, joyous affair with plenty of advertisement, art balls, and motor-omnibuses. Probably the bulk of artists prefer the stimulating delights of town; at all events, the bulk of artists do very poor stuff. But we may remember that God loves the average man because there are so many of them.

**London House Fronts.** We give on the opposite page illustrations of two groups of houses similar in type and in position. One group faces Hyde Park and the other St. James's Park; both have a northerly aspect, but look over the parks. "They were," says Professor W. R. Lethaby, "probably just builders' work of the time (about 1800), without pretence of style or worry about design beyond the commonsense of the conditions. All the same, indeed, all the more, they look—apart from unnecessary untidinesses—like pleasant dwellings. In London there are a great number of houses of a somewhat similar kind, many of them having balconies of delicate ironwork which are very suggestive of a proper way of approaching the house-building problem in cities. One of the most useful pieces of work I can think of at this time is by a systematic study of such direct ways of building kept absolutely clear from style talk or even thought. I once began such a collection, but it is one of the things I am afraid I must give up."

**Gateway of the Great Square, Teheran.**

By Mr. Sydney W. Carline.

From the picture at the Goupil Gallery. (*See page 417.*)

# GENERAL NEWS.

### Proposed Memorial at Folkestone.

The Folkestone War Memorial Fund is appealing for subscriptions for the erection of a monument, to be erected at the east end of the Leas, at the top of the slope leading down to the harbour, in memory of residents who died in the war.

### A Large Property Deal.

It is reported that Mr. H. J. P. Thomas, of the firm of James Thomas & Son, surveyors, of Haverfordwest, has purchased the town of Milford Haven. The property is valued at about £250,000, the vendors being the National Provident Institution.

### The Victoria and Albert Museum.

The Departments of the Board of Education which are still occupying parts of the Victoria and Albert Museum, South Kensington, are now returning to their official quarters in Charles-street, Whitehall, and it is stated that the Museum will be entirely released from Government occupation by the end of this month.

### R.I.B.A. Examination Fees.

The Royal Institute of British Architects announces that the scale of Examination Fees is now as follows:—Preliminary, £3 3s.; Intermediate, £4 4s.; Final, £5 5s.; Special Final, £7 7s.; Special War Exemption (open only to registered students, R.I.B.A.), £5 5s.; Special War Examination, £7 7s.; Special Overseas Examination, £7s. 7s.; Licentiates, £7 7s.; Statutory, £3 3; Building Surveyors, £3 3s.

### The Imperial War Museum.

The text of the Imperial War Museum Bill, presented to Parliament by Sir Alfred Mond, First Commissioner of Works, was issued last week. The Bill provides for the creation of a permanent body in whom may be vested the objects which are to be placed in the Museum. The Board of Trustees is to consist of the Prince of Wales (President) and 24 other members, 17 of whom are to be appointed by Government departments; the remainder are to be the First Commissioner of Works, the Principal Librarian of the British Museum and representatives of the Dominions.

### Kennington War Memorial.

The Bishop of Nyasaland last week dedicated a war memorial in the Church of St. John-the-Divine, Kennington. It is affixed to the south wall of the church, and the centre-piece consists of a life-sized figure of Christ on the Cross, modelled and carved by Mr. N. Hitch. The architect was Mr. Burke Downing, F.R.I.B.A.

### Proposed Exhibition Village.

*The Daily Mail* has decided to organise a permanent exhibition to demonstrate new methods of house construction, and, subject to a suitable site being found in the immediate neighbourhood of London, firms who are devising and promoting new methods of construction will be invited to erect specimen cottages in the Village. After the buildings have been kept open for inspection, they will be sold by auction for immediate occupation. The exhibition will probably be open for three months.

### The Architectural Association.

The new club rooms at the Architectural Association's premises, 148, Bedford-square, W.C., will be open from April 12 onwards, from 10 a.m. to 10 p.m., including Saturdays. Luncheons will be served at 2s.; dinners at 2s. 6d.; and also tea. An exhibition of students' drawings, specially sent from the Massachusett Institute of Technology (Boston), and L'Ecole Nationale des Beaux Arts (Paris), together with a selection of A.A. students' work, will be on view from April 12 to 20 from 10 a.m. to 10 p.m.

### Appointment.

Mr. T. P. Bennett, A.R.I.B.A., has been appointed Head of the Northern Polytechnic School of Architecture, Building and Surveying. The school includes a day trade school for boys, a day school of architecture, building and surveying, at present attended by a number of ex-officers as well as other students, and an evening school. All sections have advanced considerably in importance in the past few years under the superintendence of Mr James Campbell Reid, who has resigned through pressure of work in his private practice. The school is admirably equipped, and will, it is hoped, become of greater importance in the future.

### "Luxury Building."

The London County Council has decided to issue orders prohibiting the building of new places of amusement, so that all available labour may be concentrated on housing.

# COMPETITION NEWS.

### Bradford-on-Avon (Wilts.).

For the War Memorial Committee.—Design for a war memorial. Premium 22 guineas. Sending-in day, May 8. (See our issue for March 5.)

### Hornsey.

For the War Memorial Committee.—Designs for a war memorial. Sending-in day April 20. (See our issue for March 5.) The R.I.B.A. and the Society of Architects advise their members to take no part in the competition until conditions are revised.

### Kenilworth.

For the War Memorial Committee.—Designs for a war memorial. Premiums, £50 and £25. Mr. H. T. Buckland, F.R.I.B.A., will act as assessor. Sending-in day April 14. (See our issue for March 26.)

### Sidcup.

For the War Memorial Committee.—Designs for a war memorial to cost about £800. Sending-in day May 7. (See our issue for March 26.)

### Sheffield.

For the City Council.—Designs for war memorial halls. Sending-in day, July 31. (See our issue of March 5.)

### Cleethorpes.

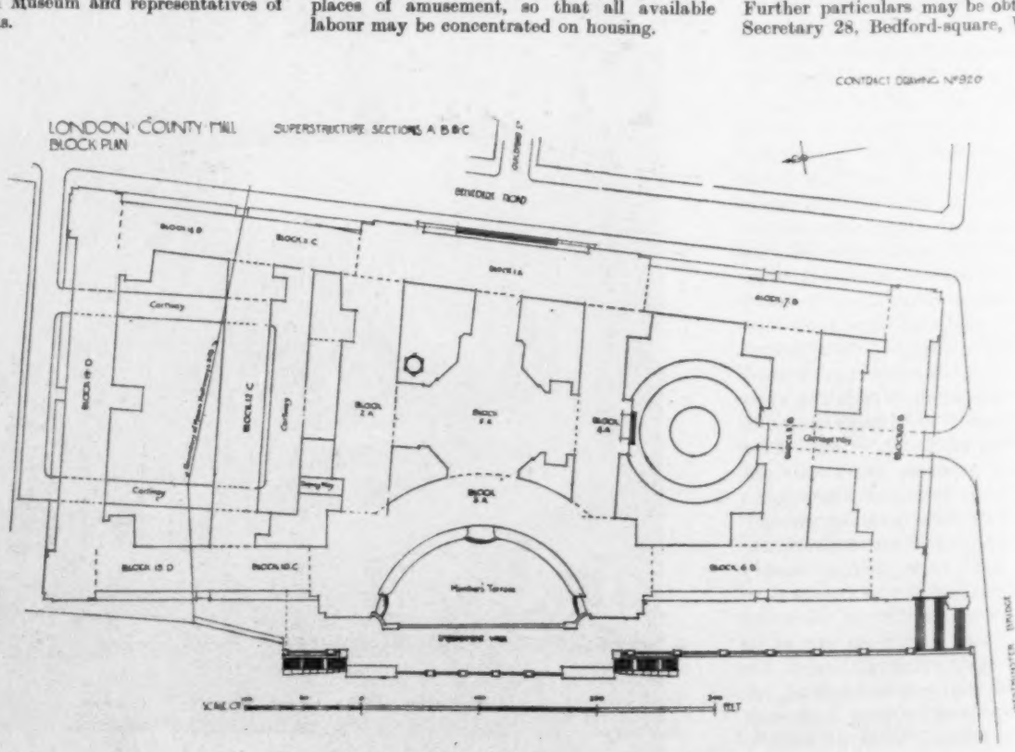
Members of the Royal Institute of British Architects and the Society of Architects are requested not to take any part in the Cleethorpes Peace Memorial Competition without first ascertaining that the conditions have been approved.

### Peterborough.

For the War Memorial Committee.—Designs for an infirmary. (See our advertisement pages to-day.)

### Society of Architects Victory Scholarship Competition.

"The Victory Scholarship" of the value of £100 and carrying with it the Gold Medal of the Society, is open for competition to any persons not exceeding 35 years of age who are British subjects. The Jury of the Beaux Arts Committee, Messrs. Arthur Davis, F.R.I.B.A., Robert Atkinson, F.R.I.B.A., and A. E. Richardson, F.R.I.B.A., will be the assessors. Further particulars may be obtained from the Secretary 28, Bedford-square, W.C.1.




**New County Hall: Block Plan.** (*See page* 415.)

# CORRESPONDENCE.

### Stockwell War Memorial Exhibition.

Sir,—In reference to the review of the Stockwell War Memorial Exhibition in your issue of March 26, we would like to say a few words about the scheme in general and about your criticism of our own design in particular—more especially as no report was required to accompany the competition drawings, and competing architects were, therefore, to some extent limited in the expression of their views.

Here was a very satisfactory small competition, under the best assessors, affording a fine opportunity for good treatment of an important open space in a busy part of south-west London; it did not attract the number and quality of designs which it deserved, presumably because it was not advertised in the building papers. It was unfortunate in the first instance that a clock tower had been decided upon by the promoters, because a small monument in the middle of the triangular site would have been more suitable to the surroundings and would have lent itself readily to a very charming composition. The only position for a clock tower was at the south corner of the site, where it would not throw the Georgian houses out of scale and would serve all the roads as a clock. Like all these memorials in the form of buildings, a clock tower must be first of all a clock tower and a memorial afterwards, if it is to express any meaning at all. It was interesting to notice the result of reverse thinking in this respect in some of the designs exhibited, which were memorial monuments primarily with clocks added to meet the circumstances. The promoters' decision in favour of a clock tower had one other unfortunate consequence, namely, that £2,000 is not enough for a tower worthy of such a position. The site is of sufficient importance to warrant a greater expenditure. Also, we were told in the conditions that the site is to be enclosed as a public garden, for which purpose it is much too small. We had hoped in the miraculous event of success in the competition to dissuade the authorities from this idea. If the whole of the site was thrown open to the pavement, preferably paved and bordered by plane trees, and possibly ornamented with a pond and fountain as a central feature, the clock tower memorial at the south corner might still be made to harmonise with its surroundings.

A successful solution of the problem obviously called for most careful attention to environment, including the measurement of the neighbouring houses, and we were surprised to read in your review that it is on the score of this very question of environment (namely, alleged disharmony with the Georgian work) that you find fault with our design. We think that you do not take fully into account the difficulties involved. An isolated clock tower large enough to carry three or four faces easily readable at a fair distance is a dominating brute by reason of his size alone, and refuses to be tamed into a nice little ornament in peaceful subjection to a terrace of Georgian houses. The only alternative is honestly to allow him to dominate so far as he must, and to see to it that he is simple and good at heart.

Lofting & Cooper.

[We were aware of the difficulties to which our correspondents draw attention, but limitation of space did not permit of discussion of the matter in general terms. We must adhere to our original opinion that, much as we admire the design in question, we consider it is unsuited to the position it would have to occupy; and this not on account of size—its actual distance from the terrace of Georgian houses would largely mitigate this—but rather on account of the treatment of the material. Brick is a material that ill-harmonises with the broad stuccoed surfaces of Stockwell-terrace, and still less with the noise and clamour that sweeps round the junction of two busy London thoroughfares. In the quietness of a cathedral city or amidst work of the preceding century, the charm of the tower and the excellence of its design would have been unassailable. Ed.]

### Economics in Relation to the Present Crisis.

Sir,—As an older reader of the *Builder*, and as one of the much-maligned craftsmen, I would like to help to bridge the chasm of misunderstanding between capital and labour. Soon after the South African War trade became very bad, men worked against one another in the fight for an existence, and only the strongest prevailed. It was the survival of the fittest, and the result was that many of the craftsmen's children were "C 3" men when required by Britain.

Men left the bricklaying trade after frightful spells of unemployment, and their children no longer followed their fathers' employment, but went into other employment that would at least offer an existence. In short, the building trade became a trade that could not support its ever lessening numbers. I remember once discussing the building of some cottages with a City agent. He told me "labour was cheap," and if I could not build for threepence-halfpenny a foot there was no place for me in the building world; at that time bricklaying was being done at £3 10s. a rod.

Trade steadied, and for two or three years before the war (when I left England) a bricklayer could rely—all things being equal—on about forty-two weeks' work per year, a carpenter, perhaps, forty-six.

I returned to England early this year, and I see the walls plastered with the notices of "work harder." My morning paper informs me that I am slacking, and so I forego a well-earned holiday and get to work. For a week or so have all my work cut out to keep my end up; men were working too fast for me, anyway. The foreman bricklayer tells me, that his men are laying 450 bricks per day, and the job is full of quoins. The quality and quantity of the work turned out on this job is quite equal with any pre-war inner-London job, and if anyone doubts this statement, I will give them the builder's and architect's addresses.

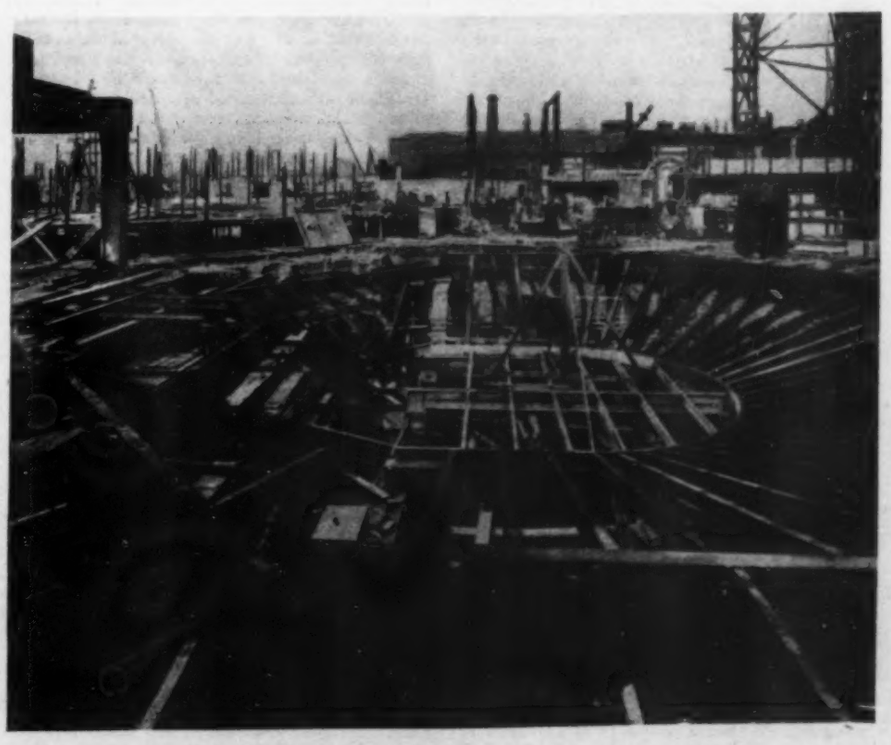
Sir Charles T. Ruthen, in his paper read recently before the Society of Architects, is logical and quite sound, and I am inclined to agree that we are unwilling to pay for the cost of our production. The end of this is inevitably a slump, but we cannot afford it. Charge an economic rent and the housing problem would be half solved, for the result would be overcrowding. I note, however, that Sir Charles admits the justice of a larger wage. Mr. P. B. Tubbs was a little right and largely wrong in his comments. Builders' businesses do require organising, but if they attempted to use a "big stick" in times like these, they would get no men on their jobs. I will illustrate the point. A week or two ago I met a joiner, who told me that he had finished up at a certain place and started at another, naming the firm. I told him that it was a good firm and that he should make good there, but he replied: "Not a bit of it; I've got a mahogany bank desk to make, and these people never seem to have a second job. Still," he said, with a grin, "the job will last until Easter." And so would mine, and so it would in the case of anyone who was not exactly a fool. And yet this firm must know that men who are discharged from one of their jobs often lose a day's pay, walk around to another job and probably start for the same firm! The builders always seem to consider their men as pedlars.

My employer is an organiser, I cannot go into his schemes, but his men are promised long periods of employment. At times he discusses his difficulties with the men, and for the moment they feel that they are not just creatures, and everybody is satisfied.

Sir Charles Ruthen says that the chief item of expense is the restriction of output. Other people have said the same, but although I have every respect for these gentlemen, I am afraid they are being imposed upon. Before the war, a cottage could be built for £200 in outer London, but not by some architects that I remember, who have planted flowers of architecture about the country.

I have endeavoured to show that the workman to-day expects unemployment to-morrow. He knows it must come, and he knows that the employers know it. May I finally say that, with a little humanity and much organising on the part of the builders, we shall hear a little less of restricted output, and if the employers would insure their craftsmen against the dreaded unemployment they would hear of it—*not at all*.

R. Midworth.



**New County Hall: Council Chamber Floor.** (*See* page 415).

# HIGHER BUILDINGS FOR LONDON.

The discussion on Mr. Delissa Joseph's paper at the Royal Institute of British Architects, on March 29, was briefly reported in our last issue. As the question of the height of buildings in London is of great interest just now, we give a fuller report below. The subject is also referred to in our "Notes."

Sir Martin Conway said that personally he had no particularly advanced views about the matter of higher buildings for London. The English people were extraordinarily conservative and liked the things they had been accustomed to. He went to America with a prejudice against skyscrapers, but it only took one day in New York for him to be entirely converted. In practical matters people had to advance much against their wishes, and in the matter of tall buildings they had only to live in one for a time not to want to live in a low building again. Those who had lived thirty stories up knew that that was the only rational place to live. In high buildings the rent was higher the higher the rooms, because it was preferable to live at a height. At a height one got out of the dust and noise and most of the fog and microbes, and obtained more fresh air and light and better views. Many people said that they wanted tall buildings, but they did not want skyscrapers. The Victoria Tower was a skyscraper, and it would look no different if lifts were installed and it were turned into a residential building. He wanted London to be kept within its present boundaries, and not to spread over the surrounding country by means of garden suburbs. It was said that London would shortly have a population of ten millions, and if they were all housed in garden suburbs it would take a day's journey to get out to the country, and nobody would be able to get out of the town except as an expedition. If London was going to have ten million inhabitants there was no alternative but to carry it upward. He had been told that, as a result of the Commission which had been appointed to inquire into the question of the necessity for the retention of the present number of churches in the City of London, twenty of them were likely to be recommended for demolition, and that office buildings would be built on the sites. That was one result of the horizontal pressure within the City—they could not afford to keep an old Wren church standing. If the policy of housing the people in high buildings in the neighbourhood of their work were adopted the horizontal pressure would not exist, ancient monuments could be preserved, and open spaces and wider thoroughfares could be provided. It did not matter exactly how high the buildings were, but there was a certain height which was the economic height. There was probably a certain height where the income reached a maximum for a minimum of cost. In these buildings there could be co-operative stores, clubs, cinemas and schools, and the whole business of a large community could be carried on much more cheaply than on garden suburb lines. These buildings could be surrounded by a considerable amount of open space, and a much larger population could be got within the present boundaries of London. They would be better housed and better served in every way, and the difficulty of transport might be considerably reduced or entirely avoided. He had in mind an area of 50 acres at St. Pancras which was to be pulled down, and thought that it might be re-erected as one large building, surrounded by an open space, and housing a whole community.

Mr. Andrew Taylor (late Chairman of the Building Act Committee and the Improvements Committee of the London County Council) said a point to be considered was the effect upon the family and child life of the population. The argument was that the high buildings would be for both residential and office purposes, otherwise the traffic chaos would not be relieved, but his impression was that the American skyscrapers were used almost entirely for office purposes. To house people 16 or 17 stories in the air would be reversing the whole trend of housing ideas to-day. How would the children get out to play? He had yet to learn that it was the only rational way to live, or that our ancestors lived above the ground level. The inhabitants of such buildings would have to get in and out by means of elevators, but elevators often went wrong and it would be essential that the elevator services should be duplicated; even then the elevators would all be useless if the supply of electricity failed. In case of fire, the lift shafts would act as flues for drawing the smoke to the top of the building and the only way of escape would be by the iron stair cases outside; in that event, on a dark winter night, when the stairs were coated with ice, it would be a very dangerous method. The Fire Brigade could not help on such an occasion, as the highest ladder used was only 90 ft. high. Also, it was only possible at present to send water to a height of about 100 feet in London, and the tops of the buildings would have to be left to burn out. He recommended that full use be made of the present Building Act before further powers were asked for. That Act permitted of buildings being erected 80 ft. to the cornice and 100 ft. to the top of the roof. That permitted of 8 or 9 stories, but only a very few buildings in London were more than 4 or 5 stories high at present. If these buildings were raised a further 4 or 5 stories much more accommodation should be obtained within the limits of the present Act without creating eyesores. In the whole of Bloomsbury, for instance, not a single house was more than 4 or 5 stories high, and they could all be raised to 100 ft. Until the existing powers were used to their full extent there was no justification for asking for additional powers. By that means the accommodation and the rating value would be doubled.

Professor Beresford Pite said that the real difficulty was the limitation of business premises to 250,000 ft. in cubical extent and 60 ft. to the top story, and he suggested that that limit should be removed. The removal of the 60 ft. limit and the substitution of the 80 ft. limit would afford great relief to architects of commercial buildings, and would also be a contribution towards the relief of the congestion in the City area. The County Council had the means of insisting upon adequate means of escape from such buildings in case of fire, and the hard and fast limit fixed by the Act of 1894 could very well be reconsidered in the light of present circumstances. If the Fire Brigade could deal with fires in dwelling houses 100 ft. in height, it could also deal with shops of a similar height. The main problem in London was a housing problem, and not a problem of commercial buildings. Many business firms were moving away from the central area, and the commercial problem was solving itself.

Professor S. D. Adshead said that very few would disagree with the erection of high buildings on the southern side of island sites or open spaces, but the idea of tall buildings solving the housing problem was not worth discussion. The housing problem was not one of high buildings, but of garden suburbs and satellite towns. The by-law which limited the height of buildings to 80 ft. plus 20 ft. in the roof resulted in 80 ft. of building and 20 ft. of "jerry building." This was noticeable in some of the buildings in Kingsway, where some of the extra two stories above the cornice were most discreditable.

Mr. W. J. H. Leverton said that the London Society was not in favour of skyscrapers, as suggested by Mr. Delissa Joseph, and the sole object of that Society was to improve the amenities of London.

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Mr. John W. Simpson (President) said that the Institute was setting up a Building Act Committee in order to assist the County Council in such matters. He hoped that the suggestion that all the houses in Bloomsbury should be carried up to 80 ft. would not be carried out. There was always a happy medium, and that was the economic height. He thought the L.C.C. should have more power than at present to settle that economic height. In certain places buildings might be carried up to a greater height than the present limit, but in other places they should not be carried up to 80 ft. With regard to the fire risk, he submitted that it was not the business of the building to follow the Fire Brigade, but of the Fire Brigade to follow the buildings. If they could not squirt water to a height of 200 ft. it was time they saw about trying to do so.

## BOOKS.

*Earthenware.* By G. Woolliscroft Rhead. (London: Herbert Jenkins, Ltd. Price, 6s. net.)

So long as ever men have tried to express their love for ornament, we may find evidence of it in various forms of pottery. If we use the word civilisation in a limited sense we may, in fact, say the art of the potter almost outruns it. The art of pottery, so far as this country is concerned, is admirably dealt with in this publication by Mr. Rhead, and the work will be most valuable to collectors, for the book covers the whole story of British earthenware from that of the slip and salt-glazed period to the work of the early 19th century. There are sixty illustrations, some of them rare, and a good many more quaint than beautiful. The volume is well produced.

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We have perused this little book carefully because text books on arbitrations are wanted, and there appears to be no recognised means of acquiring the knowledge necessary for the conduct of these highly responsible proceedings. The author's experience is evidently drawn mostly from trade cases, which are not likely to come under the review of the architect, and he assumes that in most cases no specific designation of one arbitrator or person empowered to appoint him will be made. Rather that each side will appoint its own arbitrator, and these, if necessary, an umpire. We may, therefore, perhaps happily take credit for a state of things under the usual building contract very different from that which the author depicts under average commercial circumstances, where it would appear from him that an arbitrator is quite frequently biased in favour of the party to whom he owes his appointment. Such an attitude is the entire negation, as the author points out, of the object of the office. Incompetence we must find at times, but partiality is of rare occurrence. Having thus delivered ourselves, let us add that the book contains a great deal of useful information. The Act of 1889 forms a chapter, followed by chapters on Submission, Arbitrators, Umpires, Proceedings, Awards, Court References, and Special Arbitrations. We think that the subject of Proceedings is worth a good deal more than seven pages even in this small volume, but it is easy to criticise where so large a subject is so compressed.

# STEELWORK IN THE NEW COUNTY HALL.

The following is an abstract of a paper read by Mr. E. Lawrence Hall at the last meeting of the Concrete Institute. We are indebted to the author and the Concrete Institute for permission to reproduce the accompanying illustrations of the work:—

This building is not a steel-frame structure under the 1909 Act, the architectural design requiring such substantial piers of brickwork and stone in the façades to the road and river and to the principal courtyards as to make stanchions unnecessary, and it was decided to build the walls facing the secondary courtyards complying with the Act of 1894, and also to build the corridor walls, in most cases, of sufficient thickness to carry the floors. In spite, however, of the fact that this is not a steel-frame structure, eight thousand tons of steel has been used, of which the roof and the stories in it absorb three thousand tons.

No. 1 block is in the centre of the façade towards Belvedere-road and contains the public entrance and waiting rooms and some of the committee rooms and is separated by pavilions at each end from the blocks on either side. Block 3, in the centre of the river front, is in the form of an arc on plan, and also has pavilions separating it from the adjoining blocks. Block 5 occupies the centre of the site and contains the Council Chamber. Block 9, with its two corner pavilions, occupies the entire frontage to Westminster Bridge, and contains the main entrance leading by a stone vaulted carriageway to the Members' Court. Blocks 6, 7, 9, 10, 11, 13 and 14 face the road or the river, and have stone façades, while Blocks 2, 4, 8, 12 and 15 face the courtyards and have plain brick fronts, except Blocks 4 and 8, which face the principal courtyard and enjoy more elaborate treatment. The rooms are generally 22 ft. wide and the corridors 10 ft. wide; but above the second floor the rooms are wider and the corridors narrower, the floor girders being in some cases cantilevered over the corridor walls or stanchions.

The flèche is possibly the most interesting feature of the steel frame. The topmost story consists of a vane constructed entirely of teak covered with copper, without recourse to a steel frame; it weighs about seven tons and is anchored by means of long bolts to the steelwork below. The next story, the lantern, is of light steel lattice framing about 23 ft. high, the architectural outline being constructed in teak and clothed with copper. The weight down to this point is about 24 tons. The third story down, which may be called the base of the flèche, is 21 ft. high above the eighth floor level, the topmost 10 ft. being octagonal on plan and the lower part square with projecting faces. The four corner legs are formed of pairs of 5 in. by 5 in. by ½ in. angles starred (in the form of the letter X) to a height of about 11 ft., above which point the outer angle is continued upwards but the inner one is stopped, and two pairs of angles connected by means of gusset plates are branched out and carried up a further 11 ft. obliquely, to take two of the eight legs of the octagon. At about one-third the height of this story the plan is braced by horizontal latticing.

The framing of the flèche is complicated by the irregular plan and the changes of outline, as well as by the provision of a window in the rear face, and the curvature of the plan of the building. The base is carried at the eighth floor on a pair of longitudinal compound girders, framed into two specially heavy roof girders built up of 36 in. webs with angles and flange plates, one end having to be tapered and curved to keep within the outline of the roof, and, for the same reason, the main front longitudinal girder had to be kept 3 ft. below the floor. The flèche loses itself in the roof at the eighth floor level, but all the framing below is stiffened to carry its dead load of 75 tons and to resist a wind pressure calculated at 40 lbs. per sq. ft.

Block 3 is the only block in which the rafters are bent to the outline of the tiling. An 8 in. by 4 in. joist, curved on plan, is carried on 5 in. by 4½ in. joist uprights by means of tee cross pieces, and has cast iron stools for attaching the rafters, which are continued down and, in their turn, carry the 6 in. by 3 in. channel supporting the gutter. The ventilation duct is under the floor, and the bulkhead framing admits light to the fifth floor corridor windows.

The flèche is anchored to the fifth floor by a raking tie; there is no space in the back wall for any wind bracing, the wall being thin and the stanchions slender. A similar system of roof girders and wind bracing, but on a lighter scale, is adopted in every bay round Block 3.

The two rear legs of the flèche framing are carried over one of the lobbies to the Council Chamber on a girder which has also to take the straight end wall of Block 5, and the curved rear wall of Block 3, necessitating a "Y" shape on plan, the axes of the two blocks not being in line. This girder has a web 60 in. in depth and ⅜ in. in thickness, except to one of the branches of the "Y," which is ½ in. The "Y" girder, with its load of 660 tons, is in turn carried on two box girders, which were necessarily shallow and, therefore, heavy. Each of these girders has three webs, the central web ⅜ in. and the outer webs ½ in. in thickness by 32 in. in depth, the weight dealt with being some 435 tons on the left girder and 410 tons on the right. Four stanchions, composed of pairs of 20 in. joists and 18 in. flats, continue this part of the framing down to the ground floor, and it is similarly continued down to the raft.

The two stanchions carrying the front legs of the flèche below the fourth floor are typical of the stanchions generally. These stanchions carry about 430 tons. They are composed of two 16 in. by 6 in. by 62 lbs. rolled steel joists with two 16 in. by ⅝ in. and four 16 in. by ½ in. flats riveted to the flanges. The gross area is 88.5 sq. ins., the least radius of gyration 4.53 ins., and the pressure per sq. in. on the gross area 4.86 tons. The base of the stanchion with gusset plates and stiffeners was machined square before the base plate was riveted on, and the top of the stanchion was treated in the same manner. A grillage of two tiers of rolled steel joists distributed the load on the raft, so as to give a bearing pressure on the concrete of 12 tons per sq. ft.

The stanchions were erected in the following manner:—The grillages with their component joists were spaced and bolted, the two tiers bolted together were placed in position on steel wedges and the stanchions were erected and bolted to them steel to steel. The stanchions were then plumbed and their tops brought to the right level, the grillages were then grouted underneath with neat cement, and finally filled in and around with fine Portland cement concrete. The stanchions themselves, wherever they are of hollow section, are also filled with concrete.

The concrete raft was placed on the top of the layer of ballast, being composed of five layers, each 12 in. thick, of six to one Portland cement concrete, not reinforced, a two to one Portland cement and sand dampcourse being laid between the first and second layers. The retaining walls are also of mass concrete, six to one, about 23 ft. high, 10 ft. thick at the base, tapering to 4 ft. thick at the top.

The blue brick piers, each 12 ft. 6 in. by 3 ft. 9 in., round the arc, support the front wall and the colonnade.

In the roof of one of the pavilions of Block 3 girders 7C99 and 7C100 span 40 ft. from front to back of the left-hand pavilion. One of these girders is shown in elevation in Fig. 1. Their web plates are 36 in. deep by ¼ in. thick, with four flange angles 6in. by 6 in. by ⅝ in. and flange plates 14 in. wide, two of ⅝ in. and one ½ in. thickness. The main rafters carried on these girders are 14 in. by 6 in. joists, and in turn support 10 in. by 6 in. joist purlins, to which the 4 in. by 3 in. joist rafters are attached by bent cleats. The pavilion roofs are hipped, and the feet of the 15 in. by 5 in. joist hipped rafters are carried on stools at the bends in the girders. The ends of the front floor girder 7C104 are splayed to enter the bent parts of the main girders. The floor girder second from the front, 7C103, carries a stanchion marked SC78, which supports the top ends of the two hipped rafters and the ends of the ridges of both pavilion and curved roofs, which meet at that point.

The thrust from the stone vaulting over the members' entrance in Block 4 (Fig. 2) is restrained by a steel frame of horizontal and vertical beams, the abutments otherwise being 9 in. walls; the haunches were filled with concrete to a calculated height, to keep the line of equilibrium in the arch. Stone vaulting and a dome are also carried over the carriage drive through Blocks 8 and 9, and some steelwork was provided about these, but generally the abutments in brickwork and masonry were sufficient to take the thrusts. The section in this illustration cuts through the Council Chamber, which has a trabeated treatment with a flat ceiling; the span of 66 ft. between galleries called for the fairly heavy girders.

The section is continued through Block 2, of which a great part is carried over the two-story boiler house in the basement, on girders and stanchions. The committee rooms on the first floor of Block 2 are two stories in height and the main front wall is carried on girders over these rooms. The partitions dividing the series into separate apartments are removable by sliding down between the walls on the floor below. Block 2 has a flat roof, as have also Blocks 5 and 12.

A typical detail of the upper part of the roof generally has an "A" frame of 10 in. joists, tied at the middle height with pairs of angles, which supports steel joist ridge and purlins, which in turn carry the 4 in. by 3 in. joist rafters. A system of diagonal bracing formed of 2½ in. angles, crossed, stiffens the roof at the collar level. The roof slopes are to be of concrete 7 in. in thickness covered with red tiles of Italian pattern.

Fig. 3 is a detail of the lower part of the roof framing to Block 4. It is not quite a typical section, inasmuch as the upper girder is strengthened to carry a large tank, and the lower girder is not in this case continued to the back wall, otherwise the lines are similar to those in other parts of Block 4, and in several other blocks.

A stone colonnade occupies the front of Block 1, and drives the wall proper and the stanchions off the piers below. The stanchions stand on triple joist compound girders, the ends of which rest on grillages of two tiers of joists bedded on the massive brick piers. Gusseted brackets are placed under the second floor girders to resist racking, and for the same purpose 7 in. by 7 in. by ⅞ in. angle cleats are used above and below each girder on the upper floors. All main connections are made with rivets wherever possible throughout the work. The intermediate stanchion is discontinued at the fourth floor. Ventilation ducts are placed under the second and third floors.

The ventilation of the building is by means of air ducts, generally under corridor floors, connecting with vertical shafts carried above the roof at the intersections of blocks.

In two cases in Block 9 it was found impossible, owing to architectural considerations, to get a girder of sufficient depth to carry the work above, and resort was had to the device of placing a heavy girder at a higher level and slinging a shallow girder from it by means of 8 in. by 6 in. joist hangers to take the weight of one story only.

Fig. 4 gives a view of the framing of the dished floor of the Council Chamber.

Reinforced concrete hardly finds a place in the building but has been found convenient in some duct work, and especially in the walls and roof of a story to be added over a part of Block 12.

[The new County Hall is being erected from the designs, which were selected in competition, of Mr. Ralph Knott, and were illustrated in our issue of September 10, 1910.]

# HIGHER BUILDINGS FOR LONDON.

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SIR MARTIN CONWAY said that personally he had no particularly advanced views about the matter of higher buildings for London. The English people were extraordinarily conservative and liked the things they had been accustomed to. He went to America with a prejudice against skyscrapers, but it only took one day in New York for him to be entirely converted. In practical matters people had to advance much against their wishes, and in the matter of tall buildings they had only to live in one for a time not to want to live in a low building again. Those who had lived thirty stories up knew that that was the only rational place to live. In high buildings the rent was higher the higher the rooms, because it was preferable to live at a height. At a height one got out of the dust and noise and most of the fog and microbes, and obtained more fresh air and light and better views. Many people said that they wanted tall buildings, but they did not want skyscrapers. The Victoria Tower was a skyscraper, and it would look no different if lifts were installed and it were turned into a residential building. He wanted London to be kept within its present boundaries, and not to spread over the surrounding country by means of garden suburbs. It was said that London would shortly have a population of ten millions, and if they were all housed in garden suburbs it would take a day's journey to get out to the country, and nobody would be able to get out of the town except as an expedition. If London was going to have ten million inhabitants there was no alternative but to carry it upward. He had been told that, as a result of the Commission which had been appointed to inquire into the question of the necessity for the retention of the present number of churches in the City of London, twenty of them were likely to be recommended for demolition, and that office buildings would be built on the sites. That was one result of the horizontal pressure within the City—they could not afford to keep an old Wren church standing. If the policy of housing the people in high buildings in the neighbourhood of their work were adopted the horizontal pressure would not exist, ancient monuments could be preserved, and open spaces and wider thoroughfares could be provided. It did not matter exactly how high the buildings were, but there was a certain height which was the economic height. There was probably a certain height where the income reached a maximum for a minimum of cost. In these buildings there could be co-operative stores, clubs, cinemas and schools, and the whole business of a large community could be carried on much more cheaply than on garden suburb lines. These buildings could be surrounded by a considerable amount of open space, and a much larger population could be got within the present boundaries of London. They would be better housed and better served in every way, and the difficulty of transport might be considerably reduced or entirely avoided. He had in mind an area of 50 acres at St. Pancras which was to be pulled down, and thought that it might be re-erected as one large building, surrounded by an open space, and housing a whole community.

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# STEELWORK IN THE NEW COUNTY HALL.

THE following is an abstract of a paper read by Mr. E. Lawrence Hall at the last meeting of the Concrete Institute. We are indebted to the author and the Concrete Institute for permission to reproduce the accompanying illustrations of the work:—

This building is not a steel-frame structure under the 1909 Act, the architectural design requiring such substantial piers of brickwork and stone in the façades to the road and river and to the principal courtyards as to make stanchions unnecessary, and it was decided to build the walls facing the secondary courtyards complying with the Act of 1894, and also to build the corridor walls, in most cases, of sufficient thickness to carry the floors. In spite, however, of the fact that this is not a steel-frame structure, eight thousand tons of steel has been used, of which the roof and the stories in it absorb three thousand tons.

No. 1 block is in the centre of the façade towards Belvedere-road and contains the public entrance and waiting rooms and some of the committee rooms and is separated by pavilions at each end from the blocks on either side. Block 3, in the centre of the river front, is in the form of an arc on plan, and also has pavilions separating it from the adjoining blocks. Block 5 occupies the centre of the site and contains the Council Chamber. Block 9, with its two corner pavilions, occupies the entire frontage to Westminster Bridge, and contains the main entrance leading by a stone vaulted carriageway to the Members' Court. Blocks 6, 7, 9, 10, 11, 13 and 14 face the road or the river, and have stone façades, while Blocks 2, 4, 8, 12 and 15 face the courtyards and have plain brick fronts, except Blocks 4 and 8, which face the principal courtyard and enjoy more elaborate treatment. The rooms are generally 22 ft. wide and the corridors 10 ft. wide; but above the second floor the rooms are wider and the corridors narrower, the floor girders being in some cases cantilevered over the corridor walls or stanchions.

The flèche is possibly the most interesting feature of the steel frame. The topmost story consists of a vane constructed entirely of teak covered with copper, without recourse to a steel frame; it weighs about seven tons and is anchored by means of long bolts to the steelwork below. The next story, the lantern, is of light steel lattice framing about 23 ft. high, the architectural outline being constructed in teak and clothed with copper. The weight down to this point is about 24 tons. The third story down, which may be called the base of the flèche, is 21 ft. high above the eighth floor level, the topmost 10 ft. being octagonal on plan and the lower part square with projecting faces. The four corner legs are formed of pairs of 5 in. by 5 in. by ⅝ in. angles starred (in the form of the letter X) to a height of about 11 ft., above which point the outer angle is continued upwards but the inner one is stopped, and two pairs of angles connected by means of gusset plates are branched out and carried up a further 11 ft. obliquely, to take two of the eight legs of the octagon. At about one-third the height of this story the plan is braced by horizontal latticing.

The framing of the flèche is complicated by the irregular plan and the changes of outline, as well as by the provision of a window in the rear face, and the curvature of the plan of the building. The base is carried at the eighth floor on a pair of longitudinal compound girders, framed into two specially heavy roof girders built up of 36 in. webs with angles and flange plates, one end having to be tapered and curved to keep within the outline of the roof, and, for the same reason, the main front longitudinal girder had to be kept 3 ft. below the floor. The flèche loses itself in the roof at the eighth floor level, but all the framing below is stiffened to carry its dead load of 75 tons and to resist a wind pressure calculated at 40 lbs. per sq. ft.

Block 3 is the only block in which the rafters are bent to the outline of the tiling. An 8 in. by 4 in. joist, curved on plan, is carried on 5 in. by 4½ in. joist uprights by means of tee cross pieces, and has cast iron stools for attaching the rafters, which are continued down and, in their turn, carry the 6 in. by 3 in. channel supporting the gutter. The ventilation duct is under the floor, and the bulkhead framing admits light to the fifth floor corridor windows.

The flèche is anchored to the fifth floor by a raking tie; there is no space in the back wall for any wind bracing, the wall being thin and the stanchions slender. A similar system of roof girders and wind bracing, but on a lighter scale, is adopted in every bay round Block 3.

The two rear legs of the flèche framing are carried over one of the lobbies to the Council Chamber on a girder which has also to take the straight end wall of Block 5, and the curved rear wall of Block 3, necessitating a "Y" shape on plan, the axes of the two blocks not being in line. This girder has a web 60 in. in depth and ⅜ in. in thickness, except to one of the branches of the "Y," which is ½ in. The "Y" girder, with its load of 660 tons, is in turn carried on two box girders, which were necessarily shallow and, therefore, heavy. Each of these girders has three webs, the central web ⅜ in. and the outer webs ½ in. in thickness by 32 in. in depth, the weight dealt with being some 435 tons on the left girder and 410 tons on the right. Four stanchions, composed of pairs of 20 in. joists and 18 in. flats, continue this part of the framing down to the ground floor, and it is similarly continued down to the raft.

The two stanchions carrying the front legs of the flèche below the fourth floor are typical of the stanchions generally. These stanchions carry about 430 tons. They are composed of two 16 in. by 6 in. by 62 lbs. rolled steel joists with two 16 in. by ⅝ in. and four 16 in. by ½ in. flats riveted to the flanges. The gross area is 88.5 sq. ins., the least radius of gyration 4.53 ins., and the pressure per sq. in. on the gross area 4.86 tons. The base of the stanchion with gusset plates and stiffeners was machined square before the base plate was riveted on, and the top of the stanchion was treated in the same manner. A grillage of two tiers of rolled steel joists distributed the load on the raft, so as to give a bearing pressure on the concrete of 12 tons per sq. ft.

The stanchions were erected in the following manner:—The grillages with their component joists were spaced and bolted, the two tiers bolted together were placed in position on steel wedges and the stanchions were erected and bolted to them steel to steel. The stanchions were then plumbed and their tops brought to the right level, the grillages were then grouted underneath with neat cement, and finally filled in and around with fine Portland cement concrete. The stanchions themselves, wherever they are of hollow section, are also filled with concrete.

The concrete raft was placed on the top of the layer of ballast, being composed of five layers, each 12 in. thick, of six to one Portland cement concrete, not reinforced, a two to one Portland cement and sand dampcourse being laid between the first and second layers. The retaining walls are also of mass concrete, six to one, about 23 ft. high, 10 ft. thick at the base, tapering to 4 ft. thick at the top.

The blue brick piers, each 12 ft. 6 in. by 3 ft. 9 in., round the arc, support the front wall and the colonnade.

In the roof of one of the pavilions of Block 3 girders 7C99 and 7C100 span 40 ft. from front to back of the left-hand pavilion. One of these girders is shown in elevation in Fig. 1. Their web plates are 36 in. deep by ¼ in. thick, with four flange angles 6in. by 6 in. by ⅝ in. and flange plates 14 in. wide, two of ⅝ in. and one ½ in. thickness. The main rafters carried on these girders are 14 in. by 6 in. joists, and in turn support 10 in. by 6 in. joist purlins, to which the 4 in. by 3 in. joist rafters are attached by bent cleats. The pavilion roofs are hipped, and the feet of the 15 in. by 5 in. joist hipped rafters are carried on stools at the bends in the girders. The ends of the front floor girder 7C104 are splayed to enter the bent parts of the main girders. The floor girder second from the front, 7C103, carries a stanchion marked SC78, which supports the top ends of the two hipped rafters and the ends of the ridges of both pavilion and curved roofs, which meet at that point.

The thrust from the stone vaulting over the members' entrance in Block 4 (Fig. 2) is restrained by a steel frame of horizontal and vertical beams, the abutments otherwise being 9 in. walls; the haunches were filled with concrete to a calculated height, to keep the line of equilibrium in the arch. Stone vaulting and a dome are also carried over the carriage drive through Blocks 8 and 9, and some steelwork was provided about these, but generally the abutments in brickwork and masonry were sufficient to take the thrusts. The section in this illustration cuts through the Council Chamber, which has a trabeated treatment with a flat ceiling; the span of 66 ft. between galleries called for the fairly heavy girders.

The section is continued through Block 2, of which a great part is carried over the two-story boiler house in the basement, on girders and stanchions. The committee rooms on the first floor of Block 2 are two stories in height and the main front wall is carried on girders over these rooms. The partitions dividing the series into separate apartments are removable by sliding down between the walls on the floor below. Block 2 has a flat roof, as have also Blocks 5 and 12.

A typical detail of the upper part of the roof generally has an "A" frame of 10 in. joists, tied at the middle height with pairs of angles, which supports steel joist ridge and purlins, which in turn carry the 4 in. by 3 in. joist rafters. A system of diagonal bracing formed of 2½ in. angles, crossed, stiffens the roof at the collar level. The roof slopes are to be of concrete 7 in. in thickness covered with red tiles of Italian pattern.

Fig. 3 is a detail of the lower part of the roof framing to Block 4. It is not quite a typical section, inasmuch as the upper girder is strengthened to carry a large tank, and the lower girder is not in this case continued to the back wall, otherwise the lines are similar to those in other parts of Block 4, and in several other blocks.

A stone colonnade occupies the front of Block 1, and drives the wall proper and the stanchions off the piers below. The stanchions stand on triple joist compound girders, the ends of which rest on grillages of two tiers of joists bedded on the massive brick piers. Gusseted brackets are placed under the second floor girders to resist racking, and for the same purpose 7 in. by 7 in. by ⅜ in. angle cleats are used above and below each girder on the upper floors. All main connections are made with rivets wherever possible throughout the work. The intermediate stanchion is discontinued at the fourth floor. Ventilation ducts are placed under the second and third floors.

The ventilation of the building is by means of air ducts, generally under corridor floors, connecting with vertical shafts carried above the roof at the intersections of blocks.

In two cases in Block 9 it was found impossible, owing to architectural considerations, to get a girder of sufficient depth to carry the work above, and resort was had to the device of placing a heavy girder at a higher level and slinging a shallow girder from it by means of 8 in. by 6 in. joist hangers to take the weight of one story only.

Fig. 4 gives a view of the framing of the dished floor of the Council Chamber.

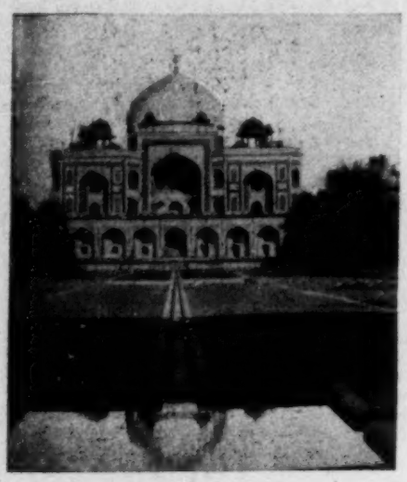
Reinforced concrete hardly finds a place in the building but has been found convenient in some duct work, and especially in the walls and roof of a story to be added over a part of Block 12.

[The new County Hall is being erected from the designs, which were selected in competition, of Mr. Ralph Knott, and were illustrated in our issue of September 10, 1910.]

# THE GREAT MOGULS.

**"East is East, and West is West,**
**And never the twain shall meet."**—*R. Kipling.*

There is probably nothing in the whole of the East which so forcibly brings home the truth of Rudyard Kipling's dictum than a vision of Indian architecture—the architecture of the Great Moguls. Ap-



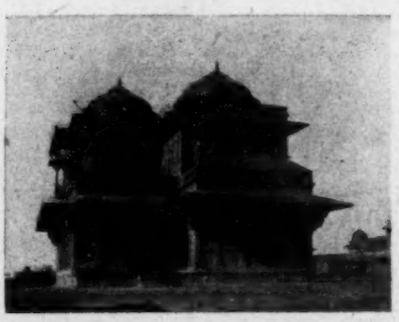
**The Tomb of Humayun, Delhi.**

proach the "darwaza" of the Taj Mahal, stand in its gateway, and there is revealed the gem of the Mogul period. The outline of its form, beauty of its dome, delicacy of its colour, the simple decoration of its inlaid gems—"perfections of a perfect whole"—these are things of which the Western mind has no conception. It is the crowning masterpiece of Eastern development.

Though the East may differ from the West, as night differs from day, the study of architecture remains the same. The buildings of any great period are made up of the forces, influences and individualities of that period, and the characters of the men of that time are portrayed in their stones; moreover, many of the characteristics of the previous generation are also to be traced in them. Periods in architecture grow slowly to their zenith through centuries. The period of the Great Moguls owes its being as much to the magnificent architecture of the preceding Hindu art as our Decorative period does to the works of the Normans.

To visit India is, for the architect, to find a new empire in which to study his master-craft. The complication of Indian history, the size of the country and number of its languages, the maze of religions and rigidity of castes, render necessary a new infancy for any attempt at a true study. A year or two in India only enforces on the mind the fact of the impossibility of knowing or understanding anything of that vast empire in so short a time.

Mr. E. B. Havell has entitled one of his works "Indian Architecture"—and that for a reason. He wishes to prove that these wonders of the Great Moguls were a true phase of Indian art—that they were not the works of the men whom the conquerors

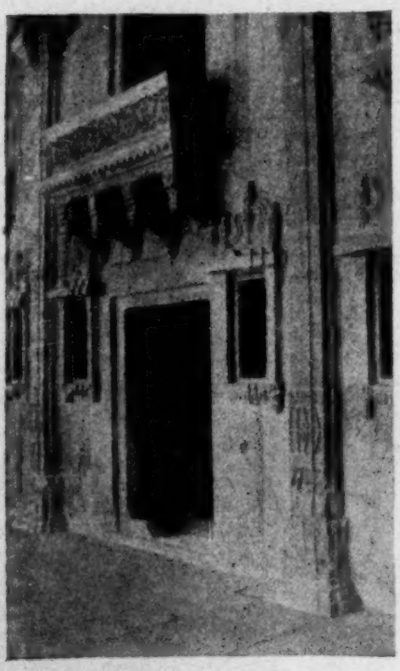


**The House of Rajah Birbal, Fatehpur—Sikri.**

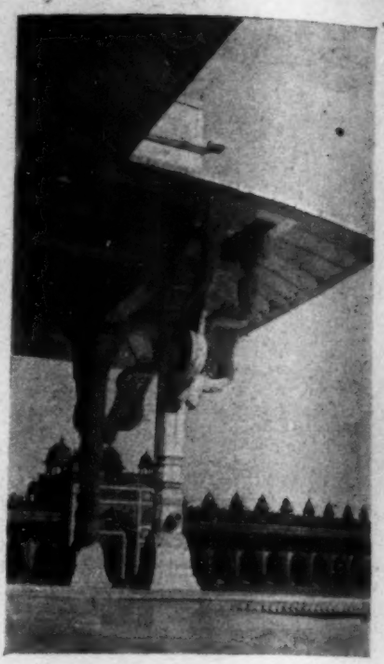
brought with them. Surely Mr. Havell is correct. The Great Mogul architecture was influenced by other than purely Indian sources, but that the work was not done by "foreign firms" is obvious. The influence of the Mogul conquerors made itself felt in India as the Norman influence did in England, and if we call our early Gothic architecture English, we must call that of the Moguls Indian.

The Tomb of Humayun, near Delhi, one of the earliest of the Mogul invaders, betrays the hand of the foreigner in form and design more than buildings in the later part of this dynasty. The form of the arches and the decoration of the façades are Persian, but the arrangement and plan and the symbolical "Five Jewels" crowning the roof are undeniably Indian. It is the germ of that masterpiece of the Moguls—the Taj Mahal; the plans of both tombs are almost identical.

Humayun was succeeded by his son Akbar, a real patron of Hindu and Buddhist art. Behold the result—the city of Fatehpur-Sikri, a return almost to pure Hindu architecture. This wonderful city, which depicts solely the works of the men of Akbar's time, was inhabited by them for only seventeen years, and then, owing



**A Court at Fatehpur—Sikri.**

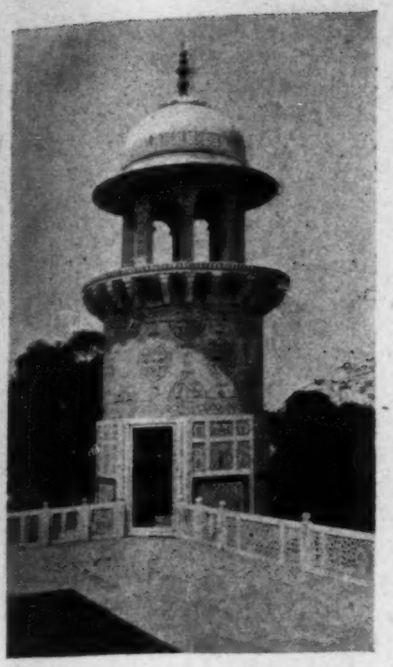


**The Tomb of Sheik Selim Chisti, Fatehpur—Sikri.**

possibly to the failure of the water supply or for some other reason, was forsaken and left solitary and deserted, as it remains to this day. Palaces, temples and halls, all are there; and it is the more remarkable to find quiet domestic architecture side by side with these, built, too, by the great Akbar. The private house of Rajah Birbal, seen in the accompanying photograph, is a beautiful and simple design of domestic work.

The carved marble porch of the tomb of Sheik Selim Chisti, the Saint of Fatehpur-Sikri, in the Jami Masjid, typifies the patience of the Indian workman in carrying out minute detail. The Buland Darwaza, or Great Gateway of the Mosque, is an example of a building constructed at the end of Akbar's reign, in which the master-builders had made the Persian element their

**The Buland Darwaza, Fatehpur—Sikri.**



Turret on the Tomb of Itmad-ud-Daulah.

own. Akbar's own tomb was commenced by himself and completed after his death by his son Jahangir, in 1613. The fretted marble panels that form the windows of this tomb are marvellously varied and exquisite in detail.

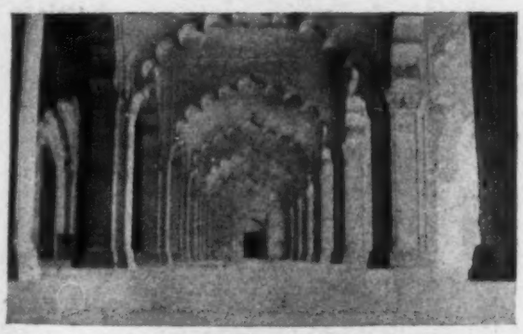
The Tomb of Itmad-ud-Daulah, Lord High Treasurer and Prime Minister at the court of Jahangir, was built by his daughter, Nur Mahal, the monarch's favourite wife. They were Persians, and the beautiful decoration of this building—coloured stones inlaid with marble—is possibly an introduction from Persia, but authorities aver that even such work as this had been found in India in earlier times. Whether or no, the decoration of this tomb was certainly the fount from which inspiration was drawn for the wondrous tessellation of the Taj Mahal.

In the reign of Shah Jehan the zenith was reached, and the Mogul art, less masculine than in the reign of the warlike Akbar, assumed a delicacy and refinement of rare beauty. That jewel, the Pearl Mosque at Agra, and lovelier even than this, the Taj Mahal itself, are the triumphs of this great age. To follow up the clues and discover upon whom the responsibility rested for each and all parts of these buildings would, indeed, be a life's work, but at least we shall come away with our conceptions broadened, with a strong desire to be freed from grooves and watertight compartments, and to branch out for ourselves in a new living art. To design in a style that is dead, ornament for ornament, moulding for moulding, is like a modern novelist imitating the style of Jane Austen. It is not to design at all. Perhaps this comparison between modern architecture and literature is the more striking, for where literature with a strong progressive movement has set up a school of its own, architecture follows devious tracks in an endeavour to find the main road of progress. We must look to the heads of the profession for discouragement of the narrow efforts of hard and fast copyism, in this or that style, scholarly though they may be, and encouragement in giving us a lead in freer and more living conceptions.

In the New Delhi, Sir Edwin Lutyens is giving us such a lead. No one has studied more deeply than he the architecture of past centuries, and yet it may truly be said that no one is more original. It remains to be proved whether "East" will not, after all, meet "West" in the old capital of the Great Moguls.

F. Harrild, Jun., M.A.

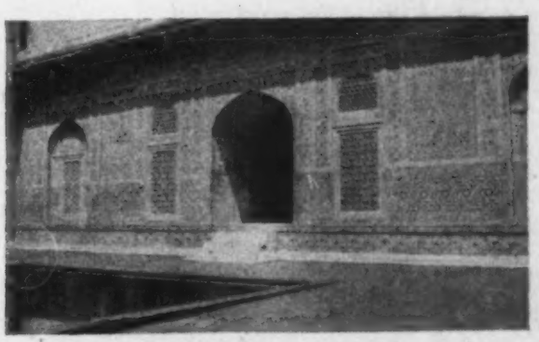
*** The photographs with which this article is illustrated were taken by Mr. Harrild.



Interior of the Pearl Mosque, Agra.

The Taj Mahal, Agra.

The Tomb of Akbar.



The Tomb of Itmad-ud-Daulah, Agra.

## EXHIBITIONS OF THE WEEK.

The pictures by Sydney and Richard Carline, which have been on view at the Goupil Galleries, show how amidst many uncertain ties of drawing and technique artists may find interesting and graphic expression. The subjects convey vivid pictures of Eastern scenes, and the daring colours are often stimulating and agreeable; it is curious that so many artists who are technically well equipped miss the power and reality of such work as this, which, under better control, would reach a very high degree of merit. The Gateway of the Great Square, Teheran, was a most striking and suggestive study for architects, who would also find much else worthy of note in such things as the relic from Tak-i-Bustan, Persia, with its curious carvings of mediæval figures and drawings from Sammarra, Damascus, &c. These artists were in the Air Force, and had exceptional opportunities for illustration which architects might well envy. We hope to see more fruits of their energies and sincerity of outlook. There is now at the Goupil Galleries a Classical landscape by Jas. Pryde which shows that gifted artist at the top of his form. The excellence of colour, the depth and force of this admirable decorative picture, ought to attract the connoisseur.

Whilst on the subject of exhibitions we may suggest that some of our picture galleries might very well vary their shows by occasionally admitting collections of fine craftsmanship, though the difficulty of forming a group of modern work would probably be a deterrent. The galleries of the R.I.B.A. would, however, be entirely suitable, and periodical exhibitions there would perhaps act as a valuable stimulus to artists who have far too little opportunity to make their talents known.

# PURITY AND FALSEHOOD IN ARCHITECTURAL DESIGN.

A CORRESPONDENT writes :—

Mr. G. H. Blagrove's article, "Thoughts on Architectural Design," in the *Builder* of December 26, is of interest, and contains some thoughtful remarks in its latter part. It seems to contain an oblique challenge to the article "Present and Future of Architectural Design" in your issue of November 14 last, in which were urged the principles of originality, truth and purity in design. It is very satisfactory to see that discussion has been re-opened on this fundamental point, and that the leading article in the same number gives a broader interpretation of the subject. As it seems the truth and significance of these ideals have not yet sunk in, a little amplification may not be amiss.

Mr. Blagrove remarks in the first paragraph that "in an atmosphere of abstract principles, there is little in the nature of a practical lead." This is surely unjust, considering the practical notes that were introduced in the first article referred to. On the contrary, the principles were urged expressly to give not only a "practical lead" but also a more practical and more enduring result; and, that this may be the case, it is imperative that underlying principles be first established on sure grounds—just as, to ensure the structural rigidity of a building, the inert solidity of the foundations must first be secured.

It is a great pity—though perhaps inevitable to a superficial student of the subject—that a plea for cessation of copyism and for purity should at once be charged as opposition to the use of precedent, which, as this critic rightly says, is not to be lightly thrown aside. Yes, use precedent by all means—but use it in its proper sense, and never lose the sense of the fitness of things. As Mr. Caulfield, of the Central School of Arts and Crafts, has rightly said, it is a deeper study of historic architecture that is needed, and not a cessation of it; the present fault lies in the shallow use of outward forms in which our students are encouraged; whereas a sense of the underlying spirit, which could be adopted — not transferred direct — to our different conditions, is what is wanted.

The contributor also remarks that to "devise details which would not be reminiscent of any known style would appear to be beyond the bounds of human capacity!" But there is no question of its practicable nature. Many examples of this pure treatment are to be seen in our streets, if an observant eye be kept on our contemporary buildings. They avoid the overloaded and fussy character of "revival", (such as Neo-Grec) ornamental masks, yet are sufficiently varied to be pleasing in effect, without any trace of the depressing bareness and dullness of most (for instance) ferro-concrete factories. Newspaper House, Fleet-street, is typical, with plain surfaces set off by a neat scheme of narrow vertical bands, broken out at string-courses at certain levels. Horniman's Museum has delicately carved panels founded on vegetable motifs. Whitehall House and St. John's Skin Hospital, Leicester-square, have vertical mouldings, properly suggestive of the stanchions behind, broken at the top through finely-poised gables. Examples could be accumulated. The advice which should be given to students is this: First frame your general design, divesting your mind of the all-consuming fire of ornament and detail; arrange the masses by the general principles of balance and proportion; let plain surfaces come into their own; then, when all essential things are settled, sketch the prevailing lines of façade design according to the constructional members which compose it, then—if detail be really needed—it is meet aptly to insert such features as may be suggested by the bounding forms.

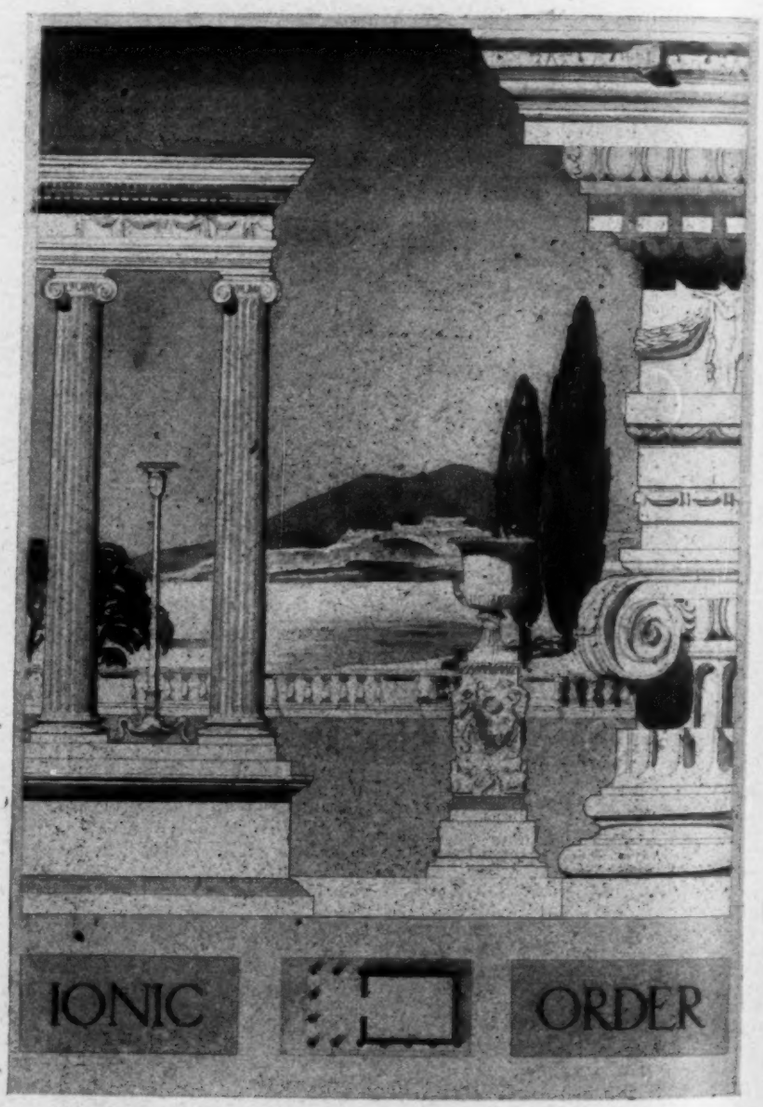
Nationality is another aim which, with all our patriotic doctrines, is continually avoided. Surely the works of our own race in earlier days are not unworthy to give us any inspiration needed. It would seem, too, that the principle of climatic fitness, obvious though it is, is a lesson yet to be learnt by the "artists" of our day. This critic goes on to say that "the ecclesiastical buildings which pleased the Popes of the sixteenth century must be thought by the man in the street to have something to commend them." What pleased the proud Pontifical eye 'neath Italy's brilliant sun must surely, for that very reason, be unsuitable in the narrow space of London's streets. Attempts to brighten should not amount to incongruity.

The constructive analogy given by Mr. Blagrove, too, is a vague and misleading one. The steel and concrete styles are not, as he suggests, trabeate, but only apparently so; they may be styled "articulate" (to borrow from Professor Lethaby's pithy terms). In trabeated work, a lintel is a solid member resting inertly on supports under its two ends, and a series of such lintels forms a continuous horizontal band, architectually treated as an "entablature." In modern skeleton building no such thing applies; and the falsity of the comparison should be obvious to one with any structural knowledge. In reinforced and steel work, the horizontals are subsidiary, and are secured by being jointed into the piers or stanchions, which become continuously vertical members utterly unlike columns. The vertical line is hence the prevailing one, and should be indicated on the façade design, as in Whitehall House.

Let us hope, then, that this movement for structural veracity will be encouraged, and for purity and initiative in design, or, if an existing style must be used, for an adaptation suited to conditions. Let nothing be placed upon a building but what is dictated by the two requirements—structural unity and truth, and pleasant aspect to the eye—there is no room in our scientific age for gratifying the tastes of purely academic minds. I am anxious to see in your columns—or through private correspondence—further evidence in favour of the same ideal, though any logical arguments on the other side will always be welcomed. Surely, however, there are not many who would openly advocate the shallow copyism of meaningless features, which, to one of impartial judgment, violates the fundamental law of truth on which should be founded all art worthy of the name.

### An R.A.'s Estate.

The late Mr. Andrew Carrick Gow, R.A., formerly Keeper of the Royal Academy, left estate valued at £10,269, with net personalty £9,980.




LIVERPOOL SCHOOL OF ART: DEPARTMENT OF ARCHITECTURE.

**Composition in the Ionic Order.**—By Mr. T. IDWAL ROBERTS.

[The illustrations on this and the next page are the work of ex-Service Students at the Liverpool School of Art, Department of Architecture. Other work was given last week.]

## SPRING VISITS II.—SYON HOUSE.

A small party of about thirty members visited Syon House, Brentford, on Saturday, March 27. Externally the house appears only as a large, square block having square angle towers and tall sash windows, oddly furnished with reveals in the Tudor manner. Its situation, however, is full of charm. A wide lime avenue leads up to the entrance front and the house is flanked by Thames meadows, beyond which is a view of Kew Gardens. Internally, the house is of great interest. Entering the vestibule, the visitor steps straight into the realm of the monumental-domestic architecture as ruled by Robert Adam at the height of his power. The vast apartment, two floors in height, has at one end a shallow apse, the semi-dome of which is richly coffered but has no architrave. At the other end the same lines are produced by an arched recess taking twin flights of six stairs and crossed by columns and an entablature in Roman Doric. This entablature, with triglyphs runs round the whole room. The ceiling is flat and its panels are triangular in shape. Disposed over the marble floor are urns, vases and statues of Roman Cæsars, English Georges and William Pitt, and a fine pair of candelabra reproducing a famous design of Piranesi's. A magnificent bronze of the dying Gaul at one end is faced by the Apollo Belvedere at the other. From the vestibule the house was found to be, in effect, four sides of a quadrangle surrounding a gloomy grass court. The reception rooms were arranged *en suite* around this court, and in one corner of the building a modest stair-well was discovered, lighted from above. The first reception room reached from the six steps under the columns was a stately apartment marked by green marble columns carrying golden statues above a cornice that broke forward for no other purpose than to support them. Between the columns were Piranesi-like trophies in low relief within sunk panels. The dining-room opening out of this was remarkable for its six statues standing in niches along the wall on each side of a pedimented fireplace, and in turn opened into a pink brocaded drawing-room with a coloured ceiling. The double doors between all these rooms stood on the centre line of the suite, and were of 2½ in. mahogany panelled and enriched with Greek ornament in gilt leadwork. The drawing-room had a really beautifully designed fireplace in Adams most delicate manner. It consisted of two Corinthian columns about 4 ft. 6 in. high carrying an entablature and dentilled cornice and a straightforward surround with panelled imposts between the columns. The materials were white statuary marble ornamented with brass or gilt leadwork. The anthemion of the frieze, the dentils of the cornice and the panel enrichments were of metal, as also were the Corinthian caps and the beaded flutes of the columns. The whole effect was gorgeous, though slightly brazen.

The library was a long, narrow room, 160 ft. long by 16 ft. wide, lighted with a long row of windows along one side. The room had been painted originally and has escaped any kind of restoration. The pale tints of cream, pink, green, gold and blue had blended with the passage of time and now harmonise pleasantly with the rows of old book-backs, and the stately pieces of Georgian furniture. This room was both homely and magnificent, and the old bewigged and snuff-taking people who sat in it must have felt happily free from the competitive dignity of Roman emperors.

The other rooms in the house were used mainly as picture galleries, and many excellent examples of the early Flemish school were to be seen. Members spent a pleasant and profitable afternoon, and were grateful for the opportunity of seeing so typical an example of the work of Robert Adam at his strongest and most delicate period.

## MEETINGS.

Friday, *April* 9.

*London Society.*—Miss Amelia Defries on "Art and the City." At Society of Arts, John-street, W.C. 4.30 p.m.

*Auctioneers' and Estate Agents' Institute.*—Sir H. Tristram Eve on "Village Reconstruction." At 34, Russell-square, W.C. 7.45 p.m.

Monday, *April* 12.

*Office of Works Art Club.*—Discussion as to whether it is desirable to establish a Ministry of Fine Arts. At Room 70 (first floor), King Charles'-street, S.W.1. 6 p.m. (Visitors invited.)

### Profit-sharing in the United Kingdom.

A Report on "Profit-sharing and Labour Co-partnership in the United Kingdom," prepared by the Ministry of Labour, has been published by H.M. Stationery Office. The Report includes all schemes whose inauguration had been notified to the Department up to October 31, 1919, and gives particulars of the number of persons employed in 1918 by the firms which had these schemes in operation; also of the rate of bonus paid, the number of participants, and the amount of the investments by employees; additional particulars for various dates in 1919 are given in certain cases. The Report contains an Appendix giving the rules of a number o schemes of profit-sharing or co-partnership. The rules reproduced in the Report have been chosen so as to present a variety of different types, in order that employers who may be thinking of introducing a scheme may have a wide choice.

LIVERPOOL SCHOOL OF ART: DEPARTMENT OF ARCHITECTURE.

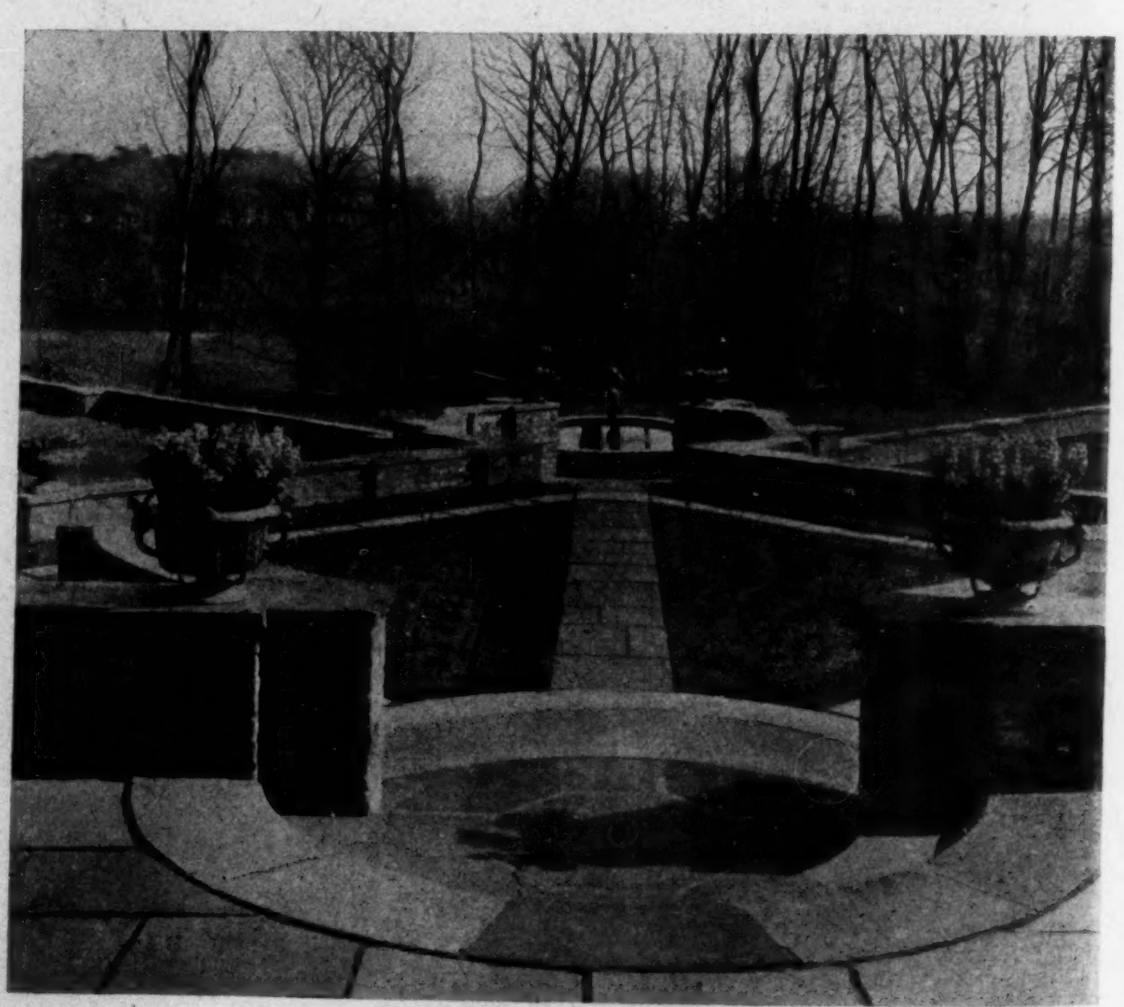
**Composition Study.** By Mr. A. L. Howarth. (*See page* 418)

# HOUSING IN GERMANY.

BRITAIN is by no means alone in her housing troubles, as readily appears from a publication bearing the above title, issued recently by our Ministry of Health. This book, in its 86 pages, gives a very full account not only of Germany's present position but of the past and present machinery utilised for dealing with this problem. In Germany, thrift institutions have had a large share in providing the capital necessary for housing, having supplied 25 million pounds between 1901 and 1917. Other capital sources are principally mortgage institutions, public utility societies and Imperial grants. Before the war the utility societies had been very active, but during the war, when private and local enterprise failed, the Government set aside £25,000,000 for housing to be used for loans, guarantees and subsidies. During the war local arbitration boards were set up for settling rent disputes and for distributing assistance towards rents, while local authorities also dispensed help towards such payment. The increase in urban population in Germany has been remarkable in recent years, but, though less is heard of rural than urban defects, the position in country districts is very bad, and in Prussia the infantile mortality is actually higher in the country districts than in the towns.

Formerly private enterprise was responsible for nine-tenths of house building, but latterly public societies have had to step in to supply the growing needs, and as far back as 1901 one-fifth of the small houses were erected by building societies, which in 1913 numbered 1,469. These societies and local authorities assist by becoming security for capital, taking shares and rendering municipal land available. State action has usually been confined to supplying capital for housing schemes. When the efforts of public societies began to prove inadequate, municipal authorities themselves began to build, and latterly temporary measures such as the use of army huts have been adopted to meet the needs in certain districts. As regards capital, the Invalidity Insurance Societies, which are a great feature in Germany and have considerable funds, have supplied a great deal of money, in addition to the more recent funds derived from municipal, State and Imperial sources and private enterprise. Under German law invalidity insurance funds to the amount of one-fourth may be invested in non-trust securities, and a good deal of money has thus been placed as second mortgages. The cause of high rents is put down in many quarters to the speculation in land which has taken place very largely in different areas, and private interests stand in the way of much development. This is so resented that a society of land reformers was started some years ago, and had in 1910 a membership of three-quarters of a million. Further, during the last year of the war a great deal of land around towns was purchased, either as a speculation or to escape taxation, by war profiteers. A great deal of speculation in land appears to have taken place in Germany, some of which has produced considerable disaster. Taxation of land presents many anomalies in Germany, where great freedom exists in the matter of local assessment. The leasehold system as known in this country is unusual in Germany, where long leases were uncommon, but the system is changing in favour of long terms with favourable conditions for the lessee. Municipal authorities have acquired a habit of purchasing land, and often part with it for housing under certain restrictions, and much attention has been paid to town planning. During the war, owing to the cessation of building and the influx of munition workers into certain areas, rents rose enormously, and legal measures had to be taken to prevent evictions, while at the same time much public assistance to meet rents has had to be given. Though Germany has no housing Act similar to our own, a year ago Housing Commissioners were appointed possessing very wide powers. These officials control specific districts, and are empowered to take land for housing if not available at a reasonable price, commandeer materials and stop building which they consider unnecessary. State assistance is otherwise confined to specific money grants, £25,000,000, as already stated, having been granted by the Reichstag in 1918, while the Prussian House of Deputies made a grant of £17,500,000, which action was confirmed by the Revolutionary Government.

Though conditions in this country are in many respects different from those in Germany, it is well to bear in mind our insular tendencies and to look at the problems and efforts of others. Hence we think our Ministry of Health has done good service in collecting this information, which must have involved much labour, and in making it available for public use.



**Kelling Hall, Norfolk: Terrace Garden.**
MR. EDWARD MAUFE, M.A., F.R.I.B.A., Architect. (*See page 421.*)

**Kelling Hall, Norfolk: House and Garden.**

Mr. Edward Maufe, M.A., F.R.I.B.A., Architect.

[This house was built for Mr. H. W. A. Deterding. The walls are of knapped squared flints, with 7 in. by 3½ in. by 2 in. Dutch brick dressings, and the roof of grizzle grey tiles. Messrs. T. Gill & Son, of Norwich, were the builders.]

## Leading Contents.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## ILLUSTRATIONS.

### Sketches in Egypt.

This week we illustrate two more views of the Ramasseum, from drawings by Mr. Fitzroy H. Darke.

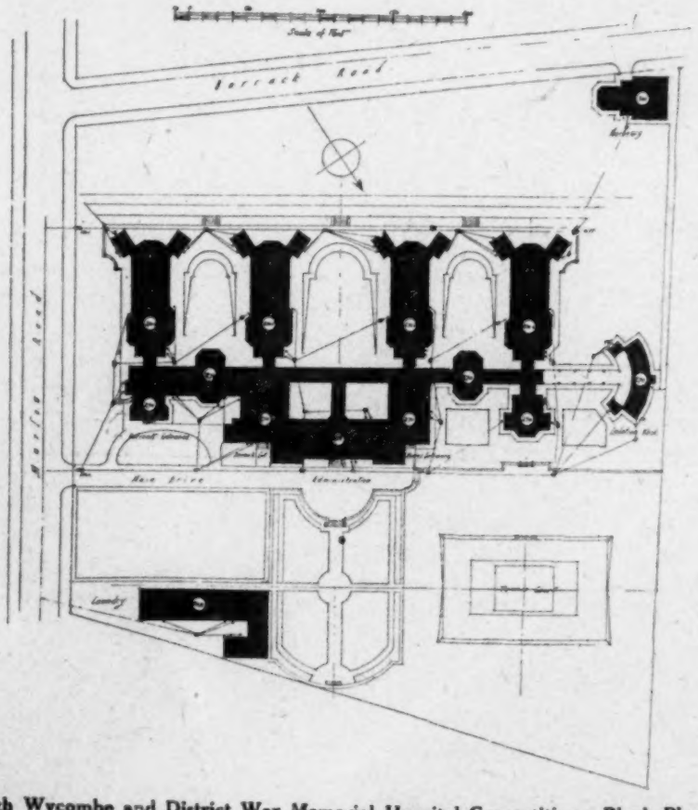
### High Wycombe War Memorial Hospital.

In the second premiated design in the High Wycombe and District War Memorial Hospital Competition, which we illustrate this week, the endeavour of the authors was to obtain the best aspect for the wards, and at the same time to place the buildings on the site so as to avoid undue cutting, and to get the wards and corridors on the same level without slopes or steps. One main corridor supplies the whole of the wards and accessory buildings, all on the same level, and divides the wards from the main building. It has been possible to keep a portion of the administrative block on a lower level. The possibility of placing the administrative block facing Marlow-road was considered, but, owing to the difficulty of the levels and the further distance which would have to be traversed to communicate with the various wards, it was decided to place this building parallel to the main corridor in a central position, and within easy access of the wards. Such an arrangement has the advantage of keeping this building, which accommodates the nursing staff, away from the dust and noise of the road, and affords a large open space in front of the building for the nurses' recreation.

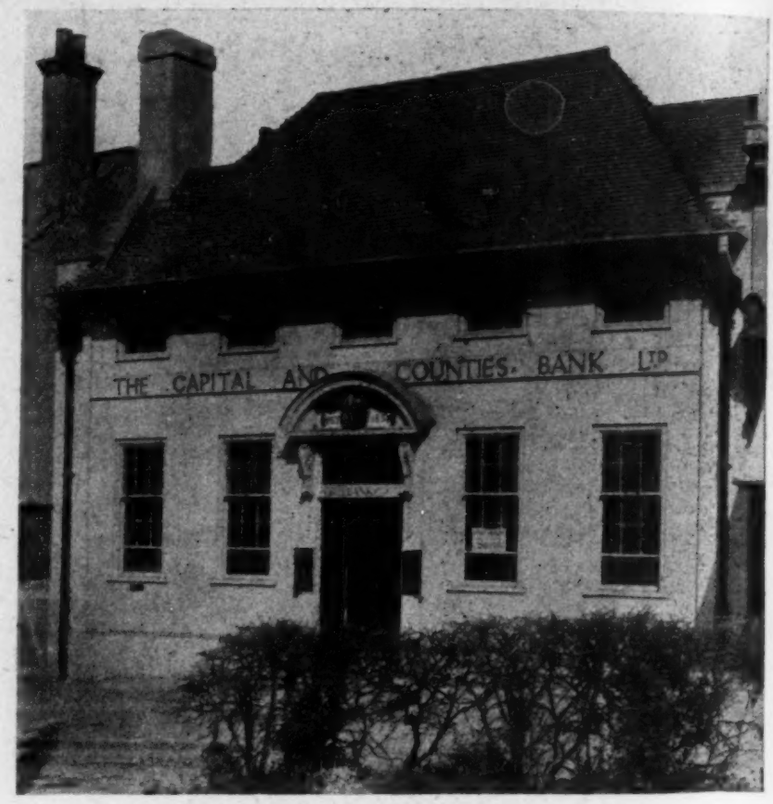
The site sloping from north to south and being practically level from east to west, the long axis of the buildings has been placed east and west. The wards are placed on the site diagonally N. and S., thus getting the maximum amount of sunshine.

The whole of the buildings, with the exception of the laundry and mortuary, are approached from one main entrance in Marlow-road, which affords easy supervision and cuts down the amount of road-making to the minimum. The patients' and out-patients' entrance is placed near the road, and is approached without passing any other part of the hospital. The administrative block contains three floors, and provides bedroom accommodation for sisters and nurses, and the second floor provides bedroom accommodation for servants and an isolated portion for sick nurses. The administrative block provides the accommodation laid down, but there is ample room for future extension by building over the sisters' and nurses' recreation rooms, and correspondingly on the other side.

The authors of this design are Messrs. Kenyon & Livock, AA.R.I.B.A., of 26, Gt. James-street, W.C.1.




**High Wycombe and District War Memorial Hospital Competition: Block Plan.**
Second premiated design, by Messrs. Kenyon and Livock, AA.R.I.B.A.




**Bank, Tidworth.**

Mr. Edward Maufe, M.A., F.R.I.B.A., Architect.

[The walls of this bank are of brick, finished with white Portland cement. Messrs. Musselwhite & Son, of Basingstoke, were the builders.]

### Cottage Designs.

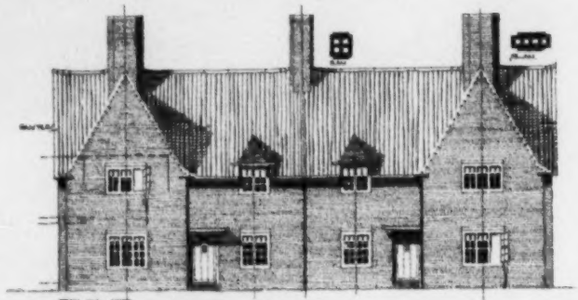
We also give designs for cottages, by Mr. David Millen, M.S.A., A.M.I.P.I.

### The New County Hall.

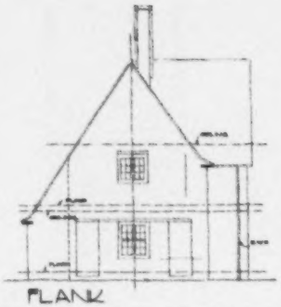
The details of the steelwork at the New County Hall, Westminster, are given in connection with a paper by Mr. E. Lawrence Hall on page 415.

THE RAMASSEUM (RAMESES II.), THEBES. FROM A DRAWING BY MR. FITZROY H. DARBY.

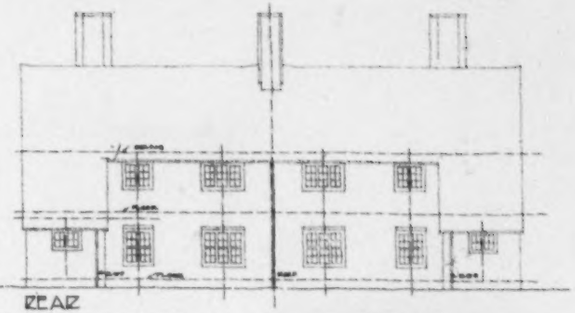
THE RAMASSEUM (COMPARE III). THEBES. FROM A DRAWING BY MR. FITZROY H. DARBY.



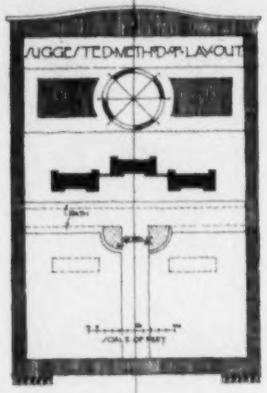
FRONT

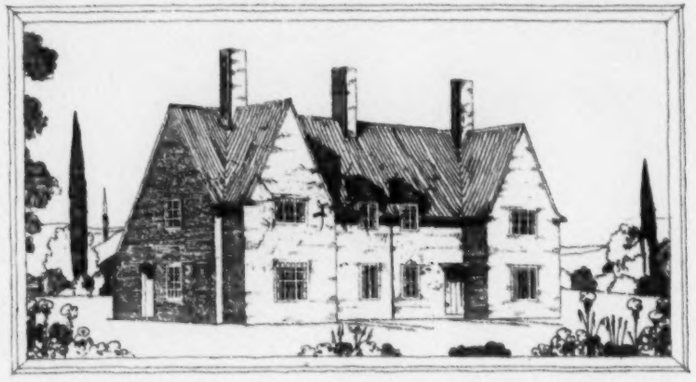


FLANK



REAR



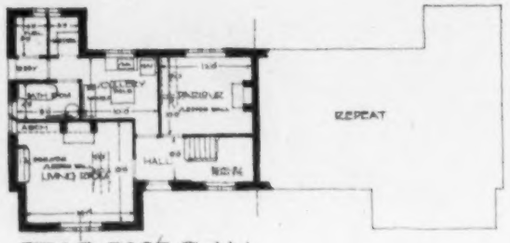



DETAILS OF CUBICAL CONTENTS

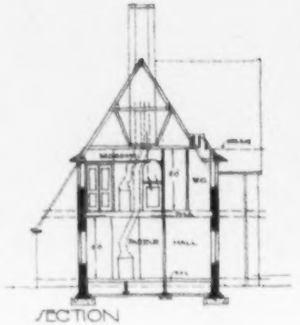
| ROOM | AREA | CUBICAL CONTENTS |
|---|---|---|
| * LIVING ROOM | 180 SQ FT | 1440 CU FT |
| PARLOUR | 120 D° | 960 D° |
| SCULLERY | 80 D° | 640 D° |
| BATH ROOM | 78 D° | 624 D° |
| LARDER | 19 D° | 152 D° |
| FUEL | 20 D° | 160 D° |
| BEDROOM 1 | 180 D° | 1,280 D° |
| D° 2 | 117 D° | 936 D° |
| D° 3 | 110 D° | 880 D° |

* EXCLUSIVE OF FIREPLACES, DRESSER, CUPBOARDS ETC.

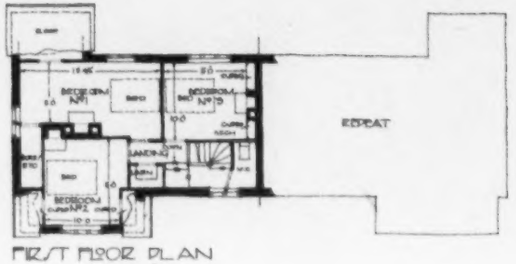
TOTAL CUBICAL CONTENTS OF EACH HOUSE 16000 CU FT AT 1½d PER L800




GROUND FLOOR PLAN

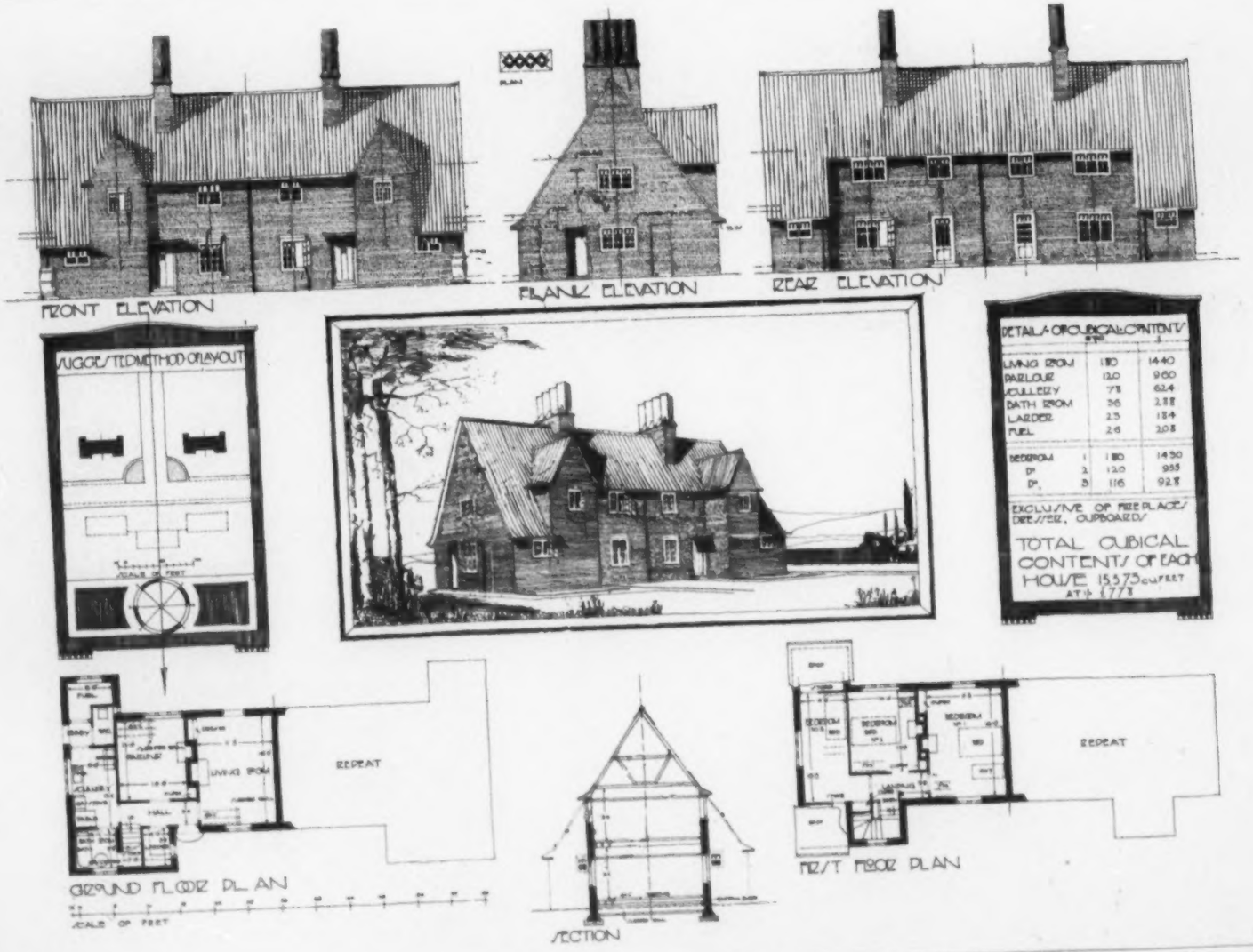


SECTION

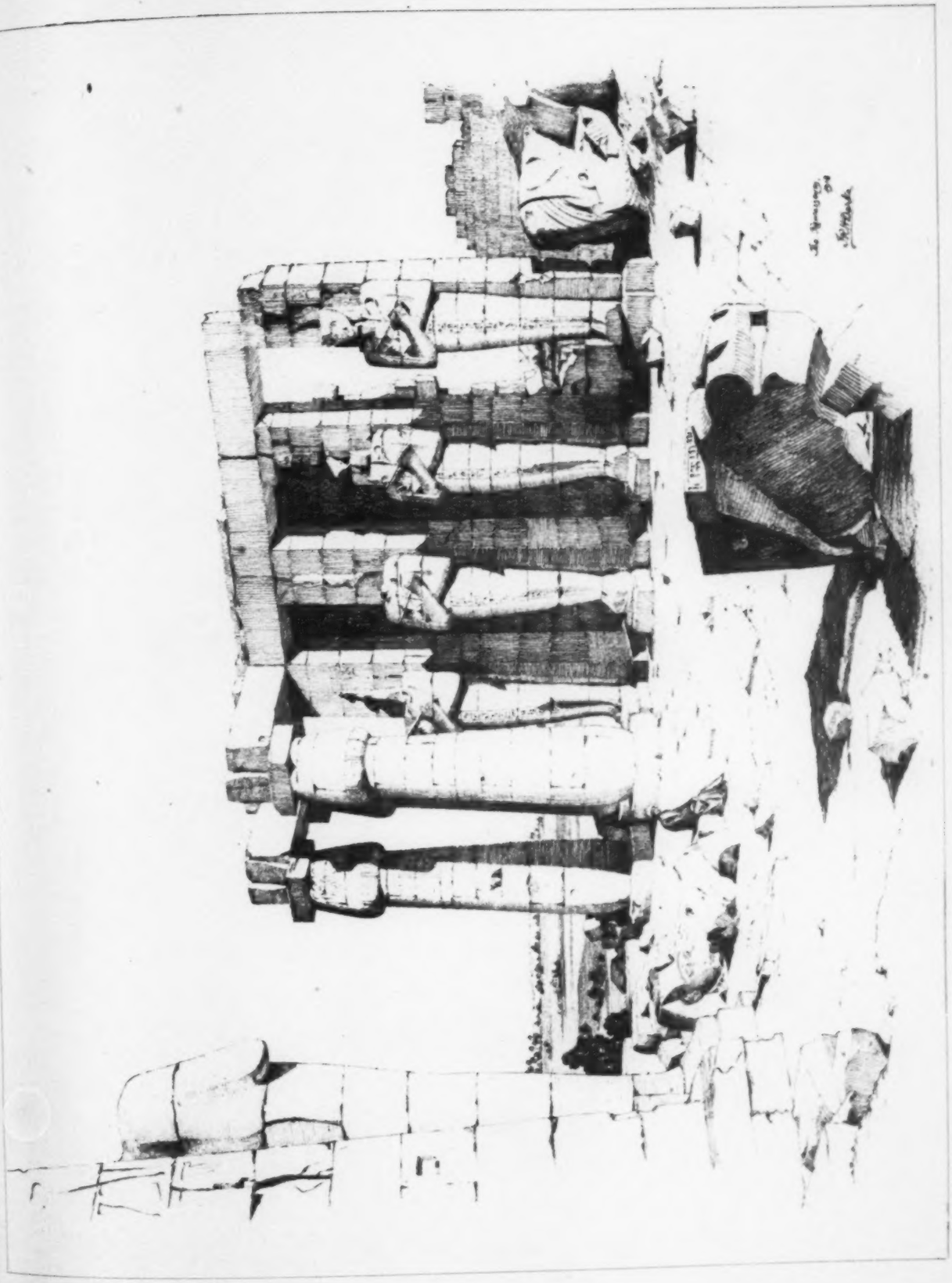



FIRST FLOOR PLAN

DESIGN FOR COTTAGES, BY MR. DAVID MILLEN, A.M.T.P.I.

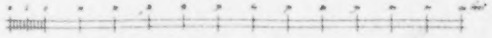



DESIGN FOR COTTAGES, BY MR. DAVID MILLEN, A.M.T.P.I.

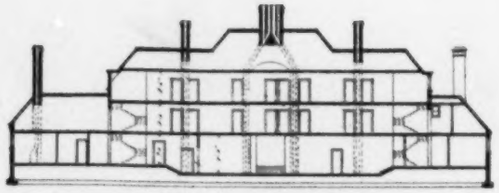


FORECOURT, THE RAMASSEUM (RAMASES II.), THEBES. FROM A DRAWING BY MR. FITZROY H. DARKE.

# HIGH · WYCOMBE · AND · DISTRICT
# WAR · MEMORIAL · HOSPITAL.



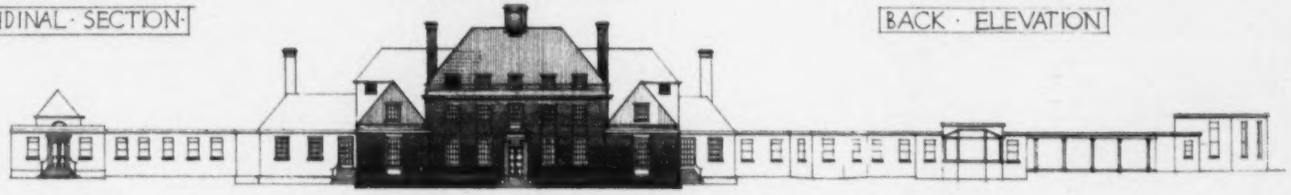
SCALE OF FEET



LONGITUDINAL · SECTION

SECOND · FLOOR · PLAN

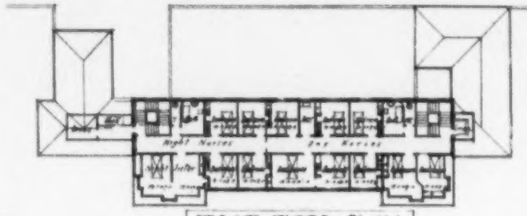
BACK · ELEVATION



FRONT · ELEVATION

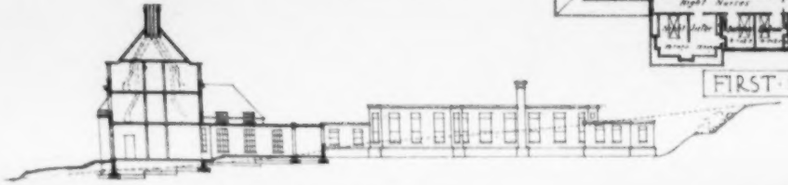
SECTION C C

ISOLATION BLOCK

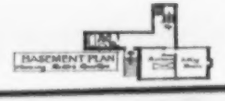


FIRST · FLOOR · PLAN

SECTION B B



CROSS · SECTION



BASEMENT PLAN

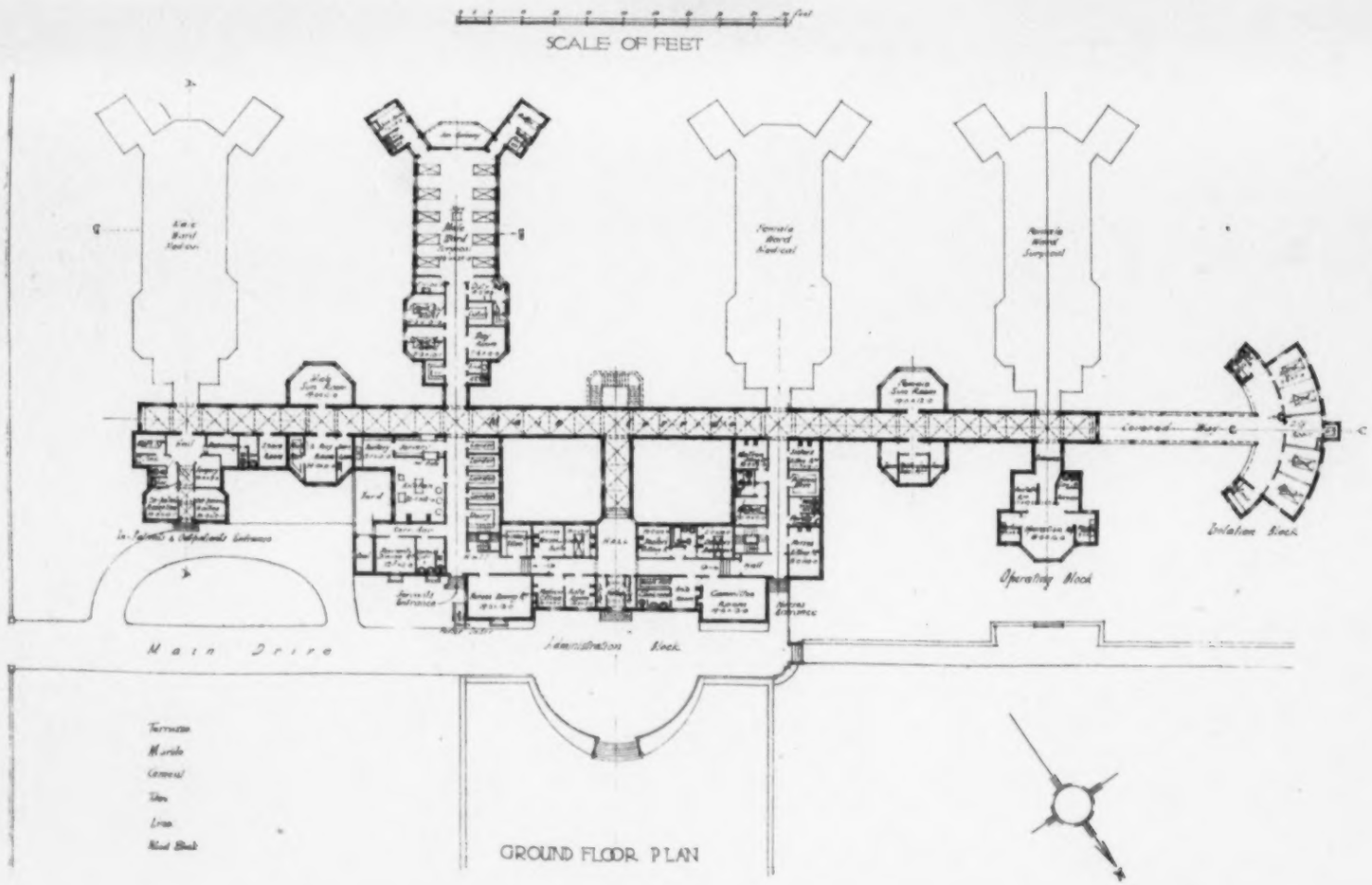
SECTION · A·A

THE BUILDER, APRIL 9, 1920.

CROSS SECTION

BASEMENT PLAN

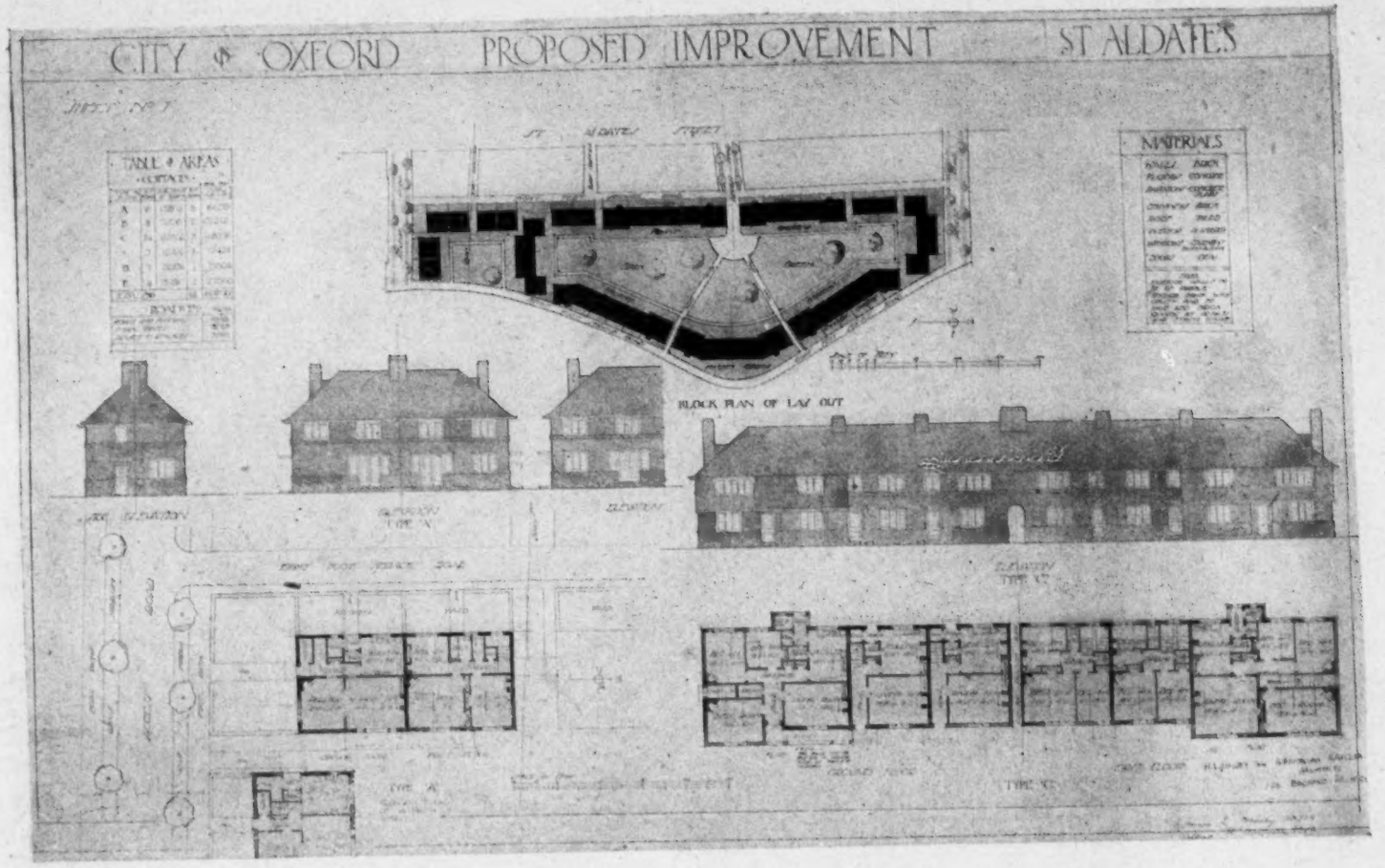
SECTION A.A.




THE HIGH WYCOMBE AND DISTRICT WAR MEMORIAL COMPETITION: SECOND PREMIATED DESIGN.

BY MESSRS. KENYON & LIVOCK, AA.R.I.B.A., ARCHITECTS.

Sculptured Panel from Pulpit, San Croce, Firenze.




**Second Premiated Design.** By Messrs. HORACE L. MASSEY and ALFRED P. MORGAN, AA.N.Z.I.A.

[This scheme, which consists of laying out 2¼ acres, comprises 56 dwellings, sub-divided into five types. Type "A" provides accommodation as follows: Living-room, parlour, scullery, three bedrooms, bath room, and offices, arranged in pairs of semi-detached cottages. Type "B" provides the same accommodation, but the houses are in blocks of four. Seventeen dwellings of Types "A" and "B" are provided. Type "C" provides living-room, scullery and offices, and three bedrooms; number of dwellings, 15. Type "D" provides the same accommodation as Type "C," but are arranged in flats; number of flats, 20. Type "E," single-story, semi-detached cottages, for old people, comprises living-room, scullery, bath room, offices and two bedrooms; number of cottages, 4. Bath rooms were not necessary to all dwellings, as a municipal bath house adjoins the site. The conditions of competition suggested a possible sixty or seventy dwellings, and an attempt was made closely to approximate this number and at the same time provide an adequate open space. The materials proposed were brick walls, concrete floors and partitions, tiled roof and sliding steel casement windows. Labour-saving methods were considered in so far as the cost permitted.]

## CIVILIAN WAR HONOURS.

THE latest list of promotions in and appointments to the Civil Division of the Order of the British Empire for services in connection with the war includes several names of interest to the architectural profession and building industry, including the following:—

*To be Commanders (C.B.E.).*

R. J. Allison, O.B.E., Principal Architect, H.M. Office of Works.

H. Baines, O.B.E., Chief Engineer, H.M. Office of Works.

J. C. Calder, O.B.E., Controller, Timber Supplies Department, Board of Trade.

W. T. Hanman, O.B.E., Director of Inland Construction, Department of Works and Buildings, Air Ministry.

G. W. Humphreys, Vice-Chairman, Munitions Works Board; Chief Engineer, London County Council.

E. Newton, R.A., Head of Building Licences' Branch, Ministry of National Service.

*To be Officers (O.B.E.).*

D. Balfour, Chief Drainage Engineer, Department of Works and Buildings, Air Ministry.

C. S. Bundock, Services in connection with the construction of munition factories.

W. Dawson, Divisional Officer in Charge, Timber Supplies Department, Board of Trade.

D. N. Dyke, Consulting Architect to British Red Cross Hospital, Netley.

A. W. Heasman, M.B.E., Assistant Architect, H.M. Office of Works.

F. C. Lea, D.Sc., Professor of Civil Engineering, University of Birmingham.

F. A. Llewellyn, M.B.E., Assistant Architect, H.M. Office of Works.

A. J. Lyddon, Assistant County Surveyor of Essex.

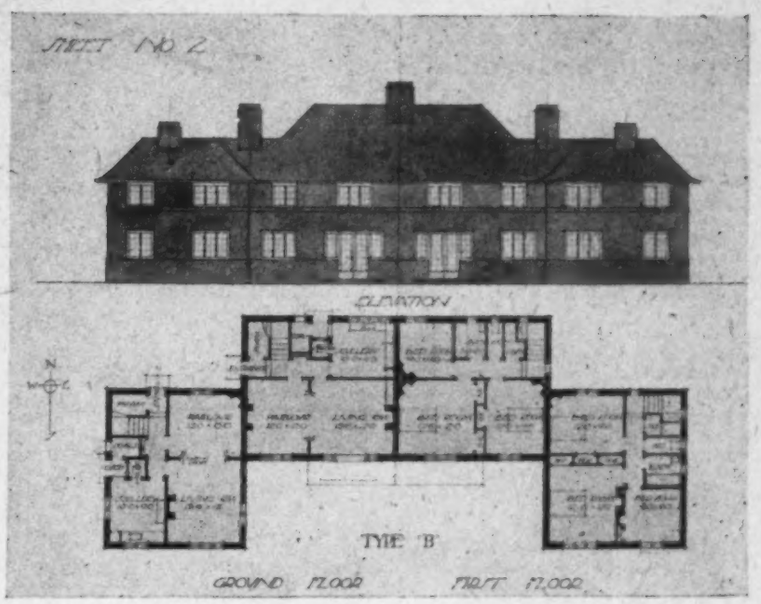
*To be Members (M.B.E.).*

C. R. Fowler, Acting Assistant Architect, H.M. Office of Works.

W. C. O'Harty, Architectural Assistant, H.M. Office of Works.

A. H. Huntley, Architectural Assistant (Second Class), H.M. Office of Works.

C. J. Mole, Acting Assistant Architect, H.M. Office of Works.

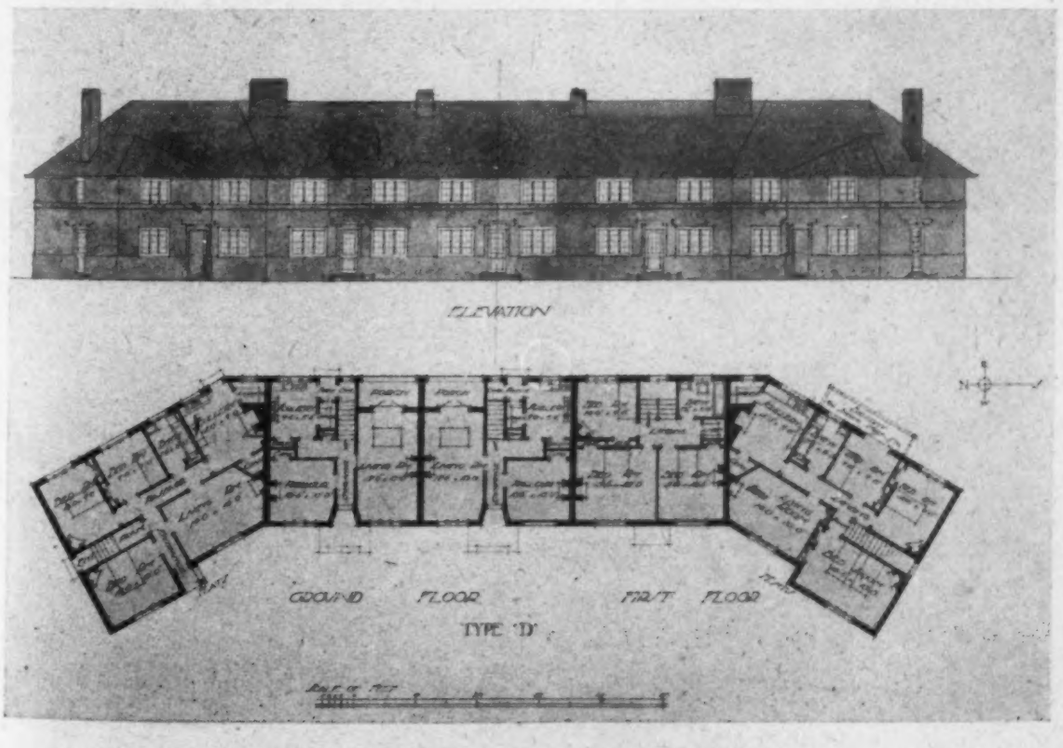



**Proposed Improvement at St. Aldate's, Oxford.**

Second Premiated Design, by Messrs. HORACE L. MASSEY and ALFRED P. MORGAN, AA.N.Z.I.A. (*See* page 424.)

### The Place of Architecture in Guild Socialism.

Mr. A. J. Penty, in a lecture before the Office of Works Art Club on this subject, said that in future, according to his view, architects would have to learn a trade and work side by side with the workman for a time, before taking up the practice of the profession. He was extremely pessimistic with regard to the future, and thought the only chance many architects would have of doing work was by entering a State department; then—good-bye to art, it would be strangled by red tape. Mr. Leverton, in the discussion, said it was a question of personality; if a man had the strength of character an architect should possess, and believed in his art and himself, he would not be hampered by officialism. Sir Frank Baines, the President of the Club, who presided, in summing up the discussion, said he thought the idea of working side by side with the workman was impracticable. He criticised the lecture at considerable length and Mr. Penty made reply. On April 12, a discussion will take place at 6 p.m., as to the desirability of establishing a Ministry of Fine Arts.




**Proposed Improvement at St. Aldate's, Oxford.**

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# THE PLANNING OF A MANUFACTURING AREA FROM AN ENGINEERING POINT OF VIEW.

By PROFESSOR E. R. MATTHEWS, A.M. INST. C.E., F.R.S. (ED.).

MOST of the manufacturing towns in our country are rapidly extending in area and population. The introduction of the Housing, Town Planning, etc., Act, 1919, has given to local authorities immense powers as regards the planning of such extensions. They are now able to determine :—

(1).—The location of any new roads—main and subsidiary—and their construction.

(2).—The general lay-out of land on the outskirts of their town, whether immediately within their borough boundary or not.

(3).—The number of houses to be erected per acre.

(4).—The general design of the buildings must also receive their approval, including their height and set back from the road.

FIG. 2.

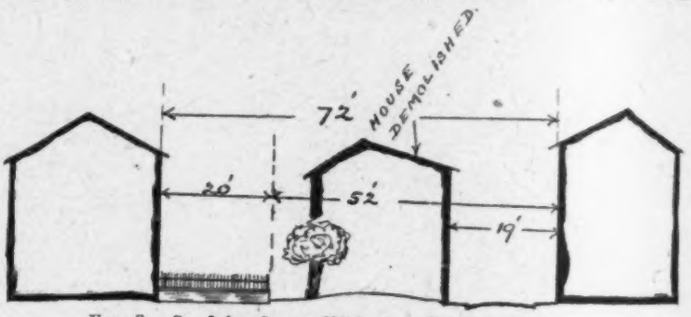



FIG. 3.—St. John Street Widening, Bridlington.

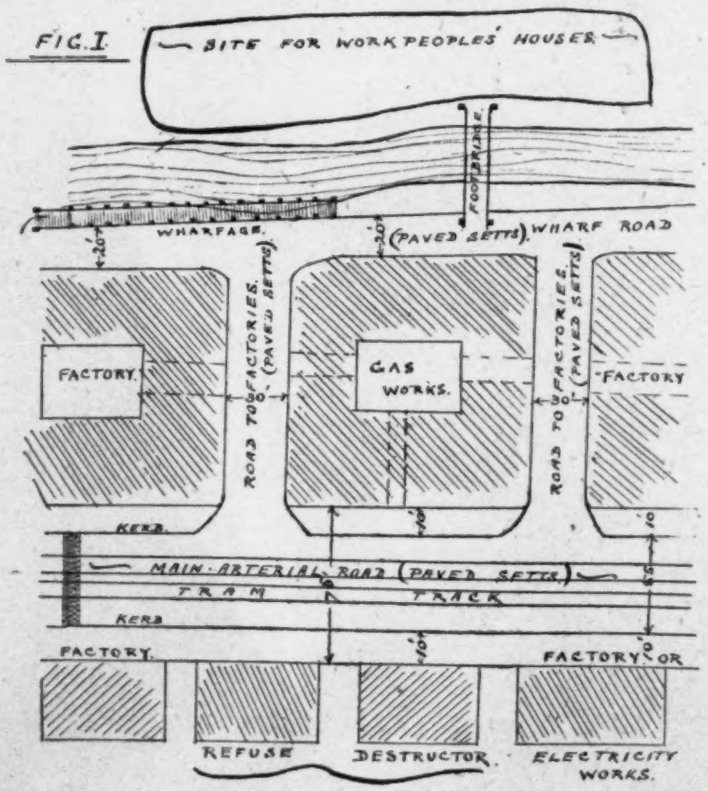
(5).—They are also able to fix the locations of (*a*) an industrial area; (*b*) shopping area; (*c*) residential area.

(6).—How the new area is to be drained, and how it is to be supplied with water, gas, electric light and power, and tramways or light railways.

The architectural and æsthetic aspects of town planning are very important, but the engineering view of it is equally so. In determining what land on the outskirts of a manufacturing town is suitable for use as an industrial area, several matters should be borne in mind. Some of these are as follows :—(*a*) The proximity of this area with its proposed factories to railway sidings and main lines, for the supply of the raw material, coal, etc., and for the disposal of the finished material; (*b*) its nearness to a river or canal; (*c*) the location of the nearest main arterial roads, and the width of these; (*d*) the suitability of such roads to take the additional heavy traffic.

It is advisable where there are railway sidings, well constructed roads, and either a canal or river, to group the factories there, finding room in another part of the area for housing accommodation for the work-people, and for the shopping area. The land forming the industrial area should be earmarked for this purpose, and practice has shown that where it has been thus earmarked for manufacturing purposes it has not lost its selling value. If water-carriage will be available, the cost of providing wharfage will have to be considered and a riverside road constructed, as well as numerous warehouses.

Some further main points that should be borne in mind when laying out an industrial area will now be dealt with :—




Planning of an Industrial Area.

(1).—The first of these refers to the housing of the work-people away from the vicinity of the factories, but sufficiently near to the works to enable them to go home for their meals; this is certainly an ideal condition and endeavours should be made to adopt it. If the housing area is on the opposite side of the river or canal to where the factories included in the scheme are, or will be, there should be a footbridge, which will make communication with the housing area easy.

(2).—The supply to the area of water and gas for power and lighting purposes is very necessary and the cost of extending the existing mains, or laying entirely new ones, is important; or establishing gas works or electricity works in the new area may be reasonable. If a gas works or electric light and power house is within the proposed industrial area, so much the better. In Fig. 1, which is a sketch plan of a portion of a new industrial area, gas works and electricity works and a refuse destructor are included.

(3).—The sewerage and sewage disposal of the new area is a very important matter; if the area lies low, it may be necessary to pump the sewage (as at Hull and in many other towns in England) to the outfall works. Here again difficulty may arise. Will the sewage disposal works be able to deal with a much greater quantity of sewage than at present, or will they have to be extended and probably additional land taken in? If the sewers from the new industrial area are to be connected to the existing sewerage system of the town, will this necessitate the enlargement of the main sewers of the town? The author had experience in this direction a few years ago. It was intended to lay out and develop a large estate adjoining a certain town, of which he was the borough engineer. This estate was just within the borough boundary and he found it impossible to bring the additional sewage and storm water into the main sewers of the town, as they were insufficient in size to take it. Several storm overflows were eventually constructed to lessen the quantity coming into the sewers, but it was found necessary to take up a number of the main sewers in the town and construct larger ones. Another query may arise. Will the levels of the proposed area allow of the sewers being connected to the sewerage system of the town, or will it be necessary to put in some form of ejector, such as Shone's, for raising the sewage?

(4).—*Widening of Existing Roads under the Act.*—The Act gives local authorities power to purchase old properties in order to widen existing streets where necessary. Previous Acts gave them a great deal of power in that direction, but the Act now under consideration increased that power.

In 1914, the author designed and carried out for the Bridlington Corporation an important street widening, known as the "St. John-street Widening"; this cost, with the purchase of properties (but deducting the income from sales of surplus building land), over £30,000. It was necessary to demolish sixty houses, including a public-house and a chapel. Nearly all the surplus land was sold, and the road was widened in its narrowest part from 19 to 52 ft. (*see* Fig. 3). New lavatories were built in the centre of the street. The widened portion of the road

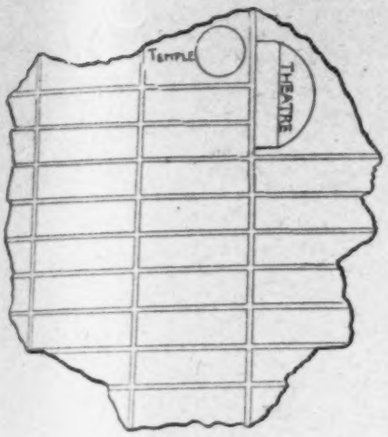



Fig. 4.

**Carthage: Portion of Street Plan.**

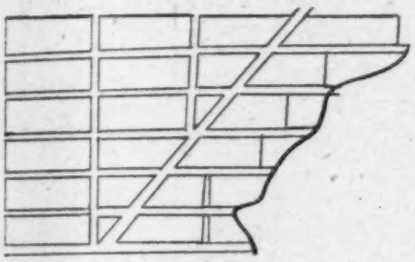


Fig. 5.

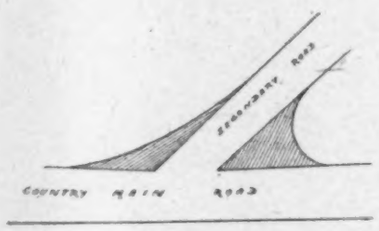



Fig. 6.

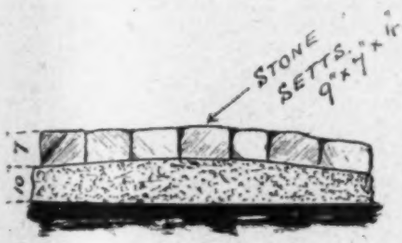



Fig. 7.

extends for over a quarter of a mile. The footpaths are 8 ft. wide; that on the east side being flagged with cement flags, and that on the west asphalted. The kerbing consists of 10 in. by 7 in. hard Yorkshire kerb, and the channel 10 in. by 5 in. York stone. The road is metalled with 2 in. whinstone, laid to a depth of 6 in. on a brick-bat foundation 12 in. in thickness (*see* Fig. 2); the bricks came from the demolished houses. In some recent cases in London and Liverpool, for each £200 spent in actual road making, £800 has had to be paid for buildings and compensation for disturbed rights.

(5).—*Sewerage System.*—In an industrial area the "separate system" should be adopted, as practically the whole of the area is paved, or covered with buildings, and the amount of storm-water reaching the surface-water sewers is, therefore, at its maximum. Great care should be taken in selecting the outfalls; these may conveniently be into a river, or a stream which has a rapid flow, or into a tidal estuary, or the sea.

It is cheaper to construct two small sewers, as in the separate system, than to put in one large sewer capable of taking sewage and storm-water. A surface-water sewer, however, need not be more than 6 to 9 ft. deep, and in designing the sewage sewer the possible extension of the area should be borne in mind, and a larger sewer constructed than is necessary at present, not forgetting, however, that it must have a sufficient velocity of flow to keep it in dry periods self-cleansing.

A further advantage in the separate system is that there is a much less quantity of storm-water to be dealt with at the outfall works, and less precipitation tank area and filtration area is necessary. In very flat districts where the whole of the sewage and storm-water has to be pumped to the outfall the cost of the additional pumping necessary by not diverting the storm water is an important item.

By putting in a separate sewer for the storm-water, the flooding of cellars is not likely to take place. On the other hand, storm-water being allowed to come into the sewage sewer keeps the latter well flushed, and this is particularly important at all dead ends, or where there are flat gradients. The introduction into the sewer of storm-water also dilutes the sewage, and makes it easier to be treated at the outfall works; ventilation of the sewer is also much easier. In a manufacturing area, however, the separate system should be adopted for the reasons named.

(6).—*Planning and Construction of Roads in Town-planning Schemes.*—The Romans laid out their country roads connecting one town with another in straight lines as far as possible; the British, however, in constructing theirs, curled around the hills, or wound over the downs, or followed the line of a river or stream. Much may be said in favour of both methods; the winding road is certainly more picturesque and less monotonous, but it has the disadvantages of being: (*a*) Of much greater length than the straight road, and (*b*) it is more costly to construct in view of its greater length.

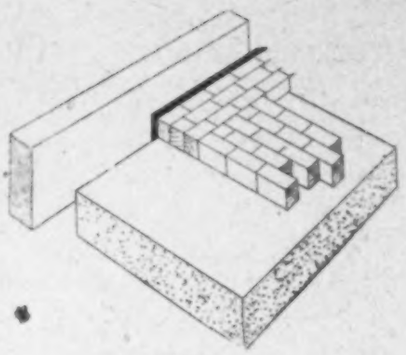


Fig. 9.

In planning a town, the Romans set it out in equal and rectangular blocks. All the streets were straight, and they ran at right angles with one another. The main streets were those connecting the four gateways of the city, namely, the gateways on the north, the south, the east and the west sides of the city. The rectangular blocks were either square or oblong in shape. Carthage is a good example of a Roman municipality of the Western Empire, where the rectangular block system was in vogue (*see* Fig. 4). This town was a Roman "colonia" in 123 B.C.* From this system the Americans, Germans, French and Italians have evolved their chessboard-pattern lay-out of streets, with occasionally a broad diagonal street added, into which the others run (*see* Fig. 5). The author does not recommend this type of lay-out in a residential or a shopping area, but it is useful in an industrial area, and where the system is adopted the cross roads should be so arranged that they will enter the main arterial road opposite others on the other side as shown in Fig. 15, and not be laid out as in Fig. 14.

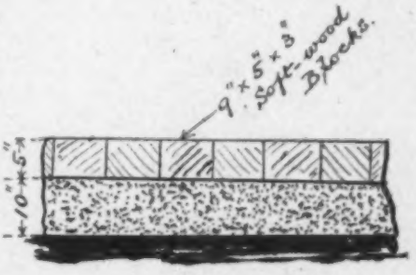



Fig. 10.

For main roads connecting towns, the author would recommend that these be straight for economic reasons as regards transport; they should not, however, be very long, but should occasionally be cut up into shorter, straight

* "Ancient Town Planning." By F. Haverfield (Oxford University Press.)

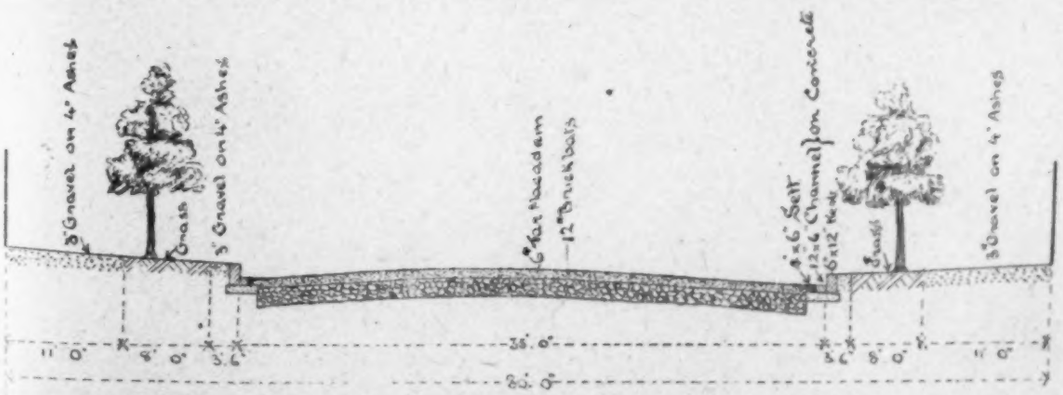



Fig. 8.—Section through Residential Main Road.

lengths. All corners should be studiously avoided, and where these do exist on old main roads, they should be rounded as shown in Fig. 6.

In an industrial area the main arterial roads should be straight, as shown in Fig. 1, and not less than 75 ft. wide from building to building where the buildings are not more than six stories high, 55 ft. of this being allotted to the road, and 10 ft. each to two footpaths. The streets leading down from this to the wharf should be not less than 30 ft. wide, the whole street area being paved with stone setts on a concrete bed (*see* Fig. 7) not less than 10 or 12 in. in thickness, and of 6 to 1 concrete. The main street should be of similar construction; the double tramway track should occupy the centre of the street, and the buildings might be 100 ft. high if the street is 100 ft. wide. Where tall buildings face a river, or park, or other open space, there is no reason why they should not be 200 ft. high. Factories would abut on this main road, but no dwelling houses, as a main arterial street in a manufacturing area is not only unsuitable owing to noise for houses to abut on it, but the sites are of too much value to allow of this. In the residential area the roads might be radial in plan, and set out in section, as shown in Fig. 8; houses should not be erected facing the main road where the trams are; these residential roads should run through to the main arterial road.

In designing a system of roads for an industrial area, where part of the area is to be occupied by factories, part to be a residential area, and part a shopping area, the streets in the area occupied by the factories should be laid out and constructed in the manner shown in Figs. 1 and 7; those in the shopping area should be paved with soft wood blocks on, say, 10 in. of concrete (*see* Figs. 9, 10 and 11). Experience during recent years has shown that the soft-wood block, although somewhat insanitary, has a great many advantages over the hard-wood block; some of these are as follows:—(1) Blocks wear more uniformly than hardwood; (2) they do not shrink and get loose as hard-wood blocks do; (3) they do not often split; (4) they cost much less, but their life is shorter; (5) they afford a better foothold for horses; (6) they are less noisy than hard-wood blocks.

The roads in the residential portion of the area should be constructed of tar macadam, and they may be laid out on the lines shown in Fig. 8.

If the streets where the factories are located have little longitudinal gradient, they may be constructed in reinforced concrete (*see* Fig. 12); and a few points as to their construction may not be out of place. (*a*) Use a 4 : 2 : 1 mixture, the aggregate being either broken stone or river gravel or sea shingle, to pass through a 2 in. ring; (*b*) one-course work is preferable to two-course; (*c*) if the gradient longitudinally exceeds 1 in 30, do not use reinforced concrete; (*d*) the reinforcement to be inserted within 2 in. of the bottom of the slab; (*e*) use a plastic mixture; (*f*) paint the surface with a bituminous mixture; (*g*) put in expansion joints every 10 ft., and avoid clinker and slag as aggregates; (*h*) thickness of concrete road to be 8 in.; (*i*) effective thickness to reinforcement, 6 in.; (*j*) leave the road two months (three months is preferable) after completion before traffic is turned on it; (*k*) to repair a road of this class, cut out the concrete down to the reinforcement and put in new concrete; (*l*) do not proceed with the work in frosty weather, and cover up and continually wet in hot weather.

The disadvantage of using reinforced concrete is that it is difficult to cut through to connect, say, a house drain, or drain from a gulley to the sewer. It is also difficult to repair the surface without doing as suggested above in (*k*). Thousands of miles of roads of this class have been constructed in America, and several in England. At Chester, Mr. Matthew Jones, M.Inst.C.E., the Borough Engineer, has just completed a further road of this type at a cost of 12s. 9d. per sup. yard. A stone-sett road, on a 12-in. concrete bed, costs to-day about 28s. per sup. yard, not including excavating in either case.

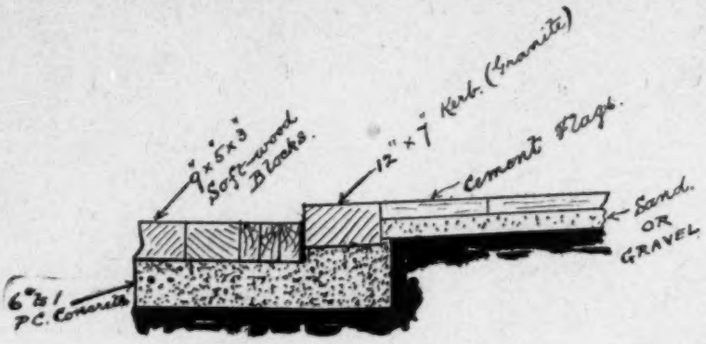



FIG. 11.

FIG. 12. **Reinforced Concrete Road.**

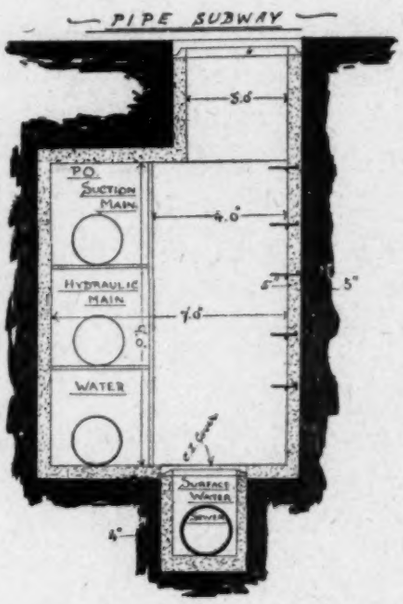



FIG. 13.

Fig. 12 represents a reinforced concrete road. A few points that should be remembered in laying out roads in an area are as follows:—(*a*) They should be designed so that there is no back land and no back roads; (*b*) they should be so arranged that little through traffic will pass over the secondary roads; (*c*) all corners should be well rounded, and there should be no sharp or dangerous turns; (*d*) the buildings in a residential area should be set back at least 20 ft.; (*e*) the shopping area should be quite separate from the residential area; (*f*) sites should be left for prominent public buildings. In urban schemes, fourteen houses to the net acre is recommended.

*Fast and Slow Traffic.*—It has been suggested that arterial roads in a manufacturing area should be not less than 100 ft., or even 120 ft. wide, so as to allow of separate parts of the road being allotted for fast and slow traffic, but the author thinks this is needless expense.

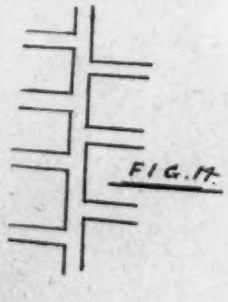
*Provision for Future Development.*—In preparing a plan of town development, it must be borne in mind that most of the industries in our towns (the motor industry for example) were not thought of a few years ago. It is well, therefore, in allocating sites (say, with river frontages) for factories, to reserve a number of sites for the establishment of new industries, and to let this land on a short lease for other purposes.

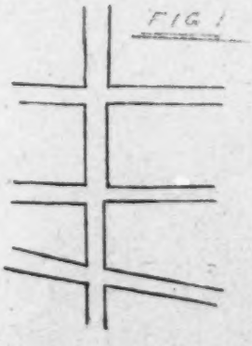
*Tramway Systems.*—Undoubtedly the system of electric trams best suited for the requirements of an industrial area is the conduit system, connecting up to the trolley system on the outskirts. No main streets should be of less width than is sufficient to accommodate a double tramway track.

*Subways.*—Subways for pedestrians should be constructed under the main street wherever there is a congestion of traffic; these may easily be built of reinforced concrete. Other subways should be constructed under the footpaths on either side of the main arterial street, to accommodate water and gas mains, electric cables, telephone and telegraph lines, hydraulic main, compressed-air main, and post office suction main. Reinforced concrete is doubtless the best material to use in their construction (*see* Fig. 13).

*Refuse Destructor and Electricity Works.*—It is well to place these together, so that the power produced by the incineration of the refuse may be utilised at the electricity works.

*Direction of Main Arterial Roads.*—This will seldom be a matter of choice, but will be controlled by existing factors.



# PROPOSED NATIONAL BUILDING CODE.—VI.

[Permission has been granted to the *Builder* by the National Federation of Building Trades' Employers to reprint the proposed National Building Code (which that body approved at a general meeting recently held in London) above the notes of a legal contributor. The first article appeared in our issue of February 13, the second on February 27, the third on March 12, the fourth on March 19, and the fifth on March 26. These articles will be continued until the whole Code has been carefully considered. The various clauses of the Code itself will be inset in the columns, followed by the comments of our contributor, whose views, we would emphasise, are not necessarily our own.]

**SCHEDULE OF CONDITIONS**—(*continued*)

**Clauses 22, 23 and 24.**

The Code, as published, states that it is "subject to the insertion of a Clause defining the position of approved Sub-Contractors," and as the above Clauses deal almost exclusively with this subject, the detailed consideration of them cannot be undertaken until the promised Clause is published. For this reason they have been omitted from the text of these articles, but it is necessary, in view of their importance, to refer briefly to the proposals of the Federation made in them. The three Clauses together consist of upwards of 1,700 words, and the whole of their subject matter is treated in a very confused manner, which is difficult for either builder or lawyer (and, after all, it may become necessary some time for the lawyer to place his interpretation upon it) to understand. They must, therefore, have the most rigid revision in order to clarify the meaning and reduce the matter to more practical dimensions. As briefly as possible the position may be summed up as follows:—

By Clause 22 no specialists or tradesmen may be employed on the instigation of the employer or architect to carry out work for which provisional sums have been included in the quantities, unless they are "declared approved sub-contractors employed by the contractor" and enter into a sub-contract approved by the Federation of Building Trades' Employers, or if they are persons or firms to whom the contractor makes reasonable objection. Such a sub-contractor may not commence work until he receives an order from the contractor to do so, and all orders must be given to him through the contractor. Moreover, by Clause 24 (*k*), if the work for which a provisional amount is inserted in the quantities is work which the contractor undertakes in the ordinary course of his business or businesses, the contractor is to have the option of carrying out the work himself if it is of a similar character to any of that already measured in the bills of quantities; or otherwise of tendering for the work, with the right to an acceptance of his tender if it is the lowest. It is by no means difficult to understand the motives of the Federation in putting forward such proposals, in view of the case of Hampton *v.* Glamorgan County Council, 1917, 33 *Times* Law Reports, p. 58, in which the House of Lords held that the contractor was the sub-contractor's principal and the architect only the agent for the contractor in regard to contracts arranged by him covered by provisional items in the contractor's contract; and also in view of the fact that the contractor is primarily responsible for the work and is often seriously inconvenienced by the employment of workmen of other firms on the job. At the same time there are many instances where an architect or employer requires special workmanship for particular work and may reasonably wish and demand that a firm known to him for previous work of the same kind should be engaged on a portion of the work; but as by Clause 25 (*b*) the employer or architect may not entrust to any artist, specialist, tradesman or person other than the contractor any work for which a provisional amount has not been inserted in the bills of quantities, a change of design involving decorative work of a special nature which the contractor is incapable of doing could not be made except in a breach of the contract.

By Clause 23 very definite provisions are made for regulating the relationship between the contractor and the approved sub-contractor, by which the contractor is to have supreme control of the work (*e.g.*, the approved sub-contractor "shall execute work and deliver plant and materials at times approved by the Contractor"); and there is a detailed sub-Clause requiring the employer to engage the contractor to execute the work and to substitute other work for a monopoly or for a process not conveniently obtainable in the event of a sub-contractor becoming bankrupt, or failing in any way to carry out his obligations. As an example of the working of such a Clause, it appears that if a firm of refrigerating experts fail to carry out their obligation as to insulation, the contractor would have the right to execute the work in a manner substituted for the monopoly method originally intended. As, however, the whole commercial adventure of the employer may depend upon the method of insulation used and may require him to obtain another known monopoly method of insulation if the first is not completed this provision seems to present the most serious difficulties.

Clause 24 details the manner of arriving at the sum which the contractor is to be paid in respect of provisional items. Such items shall be deemed to include:—

(*a*) The sub-contractor's account, including, presumably, the sub-contractor's profit.

(*b*) At least 10 per cent. for the contractor's profit, out of which, however, the contractor shall provide "free use of ordinary erected scaffolding, water from existing supplies, and all reasonable accommodation so long as the same does not interfere with the Contractor's work or workmen."

(*c*) Any reasonable charge "for the erection or use of special scaffolding, the retention of ordinary scaffolding, handling, conveying, hoisting and storing materials or other special facilities."

(*d*) Cost of cutting away for, making good after, or attendance upon the sub-contractor.

(*e*) Cost of "all carriage, delivery, packing, unpacking and also the return of and/or charges for crates, packages and other empties."

The sub-contractor's account is to be checked by the quantity surveyor, certified by the architect, and paid by the contractor, but in settling up with the contractor, the employer will pay the account together with any other items referred to above, after trade, but not cash, discount has been deducted, and without deduction of any monies in respect of any claim by the contractor against the sub-contractor for work done, materials supplied, assistance rendered, damage for delay or other breach of contract or injury to the contractor's property, and it is a condition of the contract that the contractor is entitled to deduct the amount of any such claim that he may have against the sub-contractor from the amount which the architect certifies, and the employer pays to the contractor as due to the sub-contractor. A final certificate by the architect in favour of the sub-contractor will relieve the contractor of all responsibility in regard to the work and be deemed an indemnity by the employer to the contractor in respect of the sub-contractor's work and consequential damage arising from failure of such work, and will entitle the contractor to a release of the retention money on the part of the work to which the certificate applies.

All the above provisions aim at giving the contractor proper security for any damages incurred by a sub-contractor and for his liability as to maintenance of the work, and in considering the fairness and reasonableness of the same, it should be borne in mind that the sub-contractor is really the nominee of the employer and not of the contractor, which, perhaps, justifies the contractor in requiring what in other circumstances would appear to be unreasonable, viz., an indemnity from the employer for damages in regard to the work of one with whom the contractor contracts.

**Clause 25.**

(*a*) Should the Employer or the Architect during the progress of the Works have any work executed or goods supplied additional to or in extension of any items in the Bills of Quantities or in any way ancillary to the Works, the formal orders for such work or goods shall be given by the Contractor, and the Architect shall certify for payment of same, and the amount therefor shall be added to the Contract sum as a variation under Clause 32, in the same way as if the item had been set out originally as a prime cost or a provisional amount under Clauses 26 and 22 respectively.

(*b*) The Employer or the Architect shall not entrust the execution of any work covered by this Contract to any artist, specialist, tradesman or person other than the Contractor, except where a "provisional amount" has been inserted in the Bills of Quantities for such work.

(*c*) The Contractor shall allow access for any person or persons sent on to the Works by the Employer to execute any work not ancillary to the Contract, provided that such work be executed and the material therefor be delivered to the Works at such times as have been approved by the Contractor and the Employer hereby indemnifies the Contractor from any actions, claims, damages and expenses in regard to such persons in respect of any accident from any cause to such persons or in respect of any loss or damage in any way arising to plant, tools, materials, etc., brought on to the ground for their work, despite any other provision herein contained.

This Clause purports to deal with additions other than those for which either provisional items or prime cost items have been provided. sub-Clause (*b*) restricts the freedom of the architect to give specialists' work to specialists unless it has all been contemplated and provided for at the time the bill of quantities was prepared (*see* note to Clause 22) while sub-Clause (*c*) is extremely vague as to the work which can be done by persons other than the contractor. Work "ancillary to the Contract" might be deemed to include, in the case of a house, the laying-out of a garden, or, in the case of a factory, the installation of looms. The meaning which that expression is intended to convey must surely be stated more clearly.

**Clause 26.**

(*a*) The words or letters "prime cost," "P.C." "list price," "costing," or similar words or letters included in the Bills of Quantities to indicate the value of the article to which such words or letters are applied shall in all cases mean the gross list, tradesmen's, merchants' or others price usually charged to the general public, before deducting or allowing any discount whatsoever: and against the value indicated of any such article the Quantity Surveyor shall state in the Bills of Quantities the name of the merchant or other person whose article is to be supplied.

(*b*) Provided always that when such article is to be supplied and fixed by a specialist or other tradesman to be nominated, selected or approved by the Employer or the Architect in accordance with Clause 22, the sum included in the Bills of Quantities shall in all cases be considered to be a "provisional amount" and dealt with under Clause 24 and not under this Clause.

(*c*) When such article is to be fixed by the Contractor, such fixing shall, unless fully detailed, described and set out in the Bills of Quantities so as to enable the Contractor properly to estimate its value, or unless a

"provisional amount" is included therefor, be executed by the Contractor and the Contractor's charges for and expenses in connection therewith added to the Contract sum and included in a certificate of the Architect.

(*d*) Provided always that "prime cost" or similar item shall include the cost of all carriage, delivery, packing, unpacking and also all charges for crates and packages, and the return of empties whether the same are specifically enumerated in the Bills of Quantities or not.

(*e*) All "prime cost" articles shall in all cases be ordered, obtained and supplied by the Contractor under the direction of the Architect and the list price as section (*a*) together with any costs incurred, or charges made by the Contractor under section (*d*) or in any other manner reasonably incurred by him other than under section (*c*) of this Clause, and for which no provision has been made in the Bills of Quantities as aforesaid, and profit proportionate to any profit included in the Bills of Quantities shall be set off against the amount included in the Bills of Quantities, and the difference added to or deducted from the Contract sum as the case may be, the intention being that the Contractor and not the Employer shall have the benefit of all trade, cash or other discounts, or allowances in connection with prime cost items.

(*f*) Provided and subject to the foregoing Clauses, that before placing an order for any article to be supplied for which "prime cost" is included in the Bills of Quantities, the Contractor may require the merchant, tradesman or other person nominated, selected or approved by the Architect to become his Approved Sub-contractor on the terms and conditions of Clause 22, in which case at the request of the Contractor the Architect shall certify payment of the account of such merchant, tradesman or other person on the terms provided in Clause 24, in respect of approved sub-contractors so far as they apply.

It is important, in view of the fact that a prime cost item may become a provisional item under sub-Clause (*b*) that a careful comparison should be made between the amounts to be paid by the employer for a prime-cost item as calculated under this Clause and for a provisional item as calculated under Clauses 22, 23, and 24. It is quite clear that the difference between the two items is entirely dependent upon whether or not the article is to be fixed by the contractor or by an approved sub-contractor, as, in the latter case, though the item is entered in the bill as a prime cost, it must, by the provisions of sub-Clause (*b*) above, be considered a provisional amount. Moreover, by sub-Clause (*f*) the contractor may, if he wishes, have the protection against the supplier of a prime cost item which he has against an approved sub-contractor and the indemnity which the certificate of the architect carries with it. Such comparison is therefore doubly important, and appears to be as follows:—

1. *Provisional Items.*—The contractor may charge:—(*a*) sub-contractor's charge for the article which, no doubt, will be the list price of the article as usually charged to the public; (*b*) costs of the sub-contractor for various small matters in regard to carriage, return of crates, etc.; (*c*) sub-contractor's cost of fixing and the contractor's attendance upon the same, including special scaffolding, etc.; (*d*) sub-contractor's profit on fixing; (*e*) 10 per cent. profit to the contractor over all.

2. *Prime Cost Items.*—The contractor may charge: (*a*) list price as charged to the general public for the article; (*b*) costs to the contractor in connection with various small items such as carriage, return of crates, &c.; (*c*) contractor's cost of fixing; and (*d*) "profit proportionate to any profit included in the bill of quantities."

What this last item means is very obscure, but presumably such profit would only be given on the cost of items (*b*) and (*c*), as the contractor has already got his trade discount on item (*a*) and if item (*c*) was a bill of quantities charge, the contractor would not be entitled to further profit on this. Moreover, it is expressly stated in the Code with regard to a provisional amount that it shall be deemed to include a sum equal to at least 10 per cent. for contractor's profit, whereas there is no similar provision with regard to a prime cost item. In any case, it is necessary that the matter should be cleared up quite definitely. How, for example, is one to arrive at what is "profit proportionate to any profit included in the bill of quantities?" It appears that this can only mean the profit to the contractor on the whole contract, which it is extremely unlikely that the contractor would be willing to disclose or would be able adequately to prove.

The above comparison appears to show that the employer will benefit by making his items prime cost rather than provisional ones, which is the proper encouragement for a contractor to give to an employer in order that he may have the fixing of the work in his hands wherever possible. We are anxious not to be hypercritical, but nearly the whole of sub-Clause (*a*) above is a reproduction of the definition of prime cost contained in the Interpretation of Terms Clause, and it seems absurd to have an Interpretation Clause at all if in the document itself the definitions are repeated *in extenso*.

**Clause 27.**

(*a*) Should the Works be delayed by reason of any combination of workmen, strike, lock-out or other trade dispute, the Architect shall allow such an extension of time for completion in respect thereof as shall be at least equal to the period of delay or stoppage occasioned by such combination, strike, lock-out or trade dispute. In any such case, the Contractor shall, as soon as practicable, give to the Architect written notice thereof.

(*b*) Should the Works be delayed by the operation of any Act of Parliament, Order in Council or other Government restriction or order; *force majeure*; disputes with or proceedings taken relative to the Works by any public authority, by any adjoining owner, or any person outside the Contractor's control against either the Employer or Contractor; failure of the Employer to give possession, access and accommodation or his prevention of the Contractor from proceeding regularly with the Works as provided by Clauses 3 and 5, temporary suspension of Works by Employer, exceptionally inclement weather, shortage of local labour, delay or difficulty in obtaining special material or materials of unusual size or nature, delays by specialists or approved sub-contractors under Clause 22, delays in payment when due under Clause 35, delay by men sent on to ground by Employer under Clause 25, or by way of variations and extras to the Works coming under Clauses 1, 6 and 31, or by any other cause outside the Contractor's control, the Architect shall allow a reasonable extension of the time arranged for completion, as before-mentioned in respect of each such delay, and he shall certify to the Employer and the Contractor the revised date at which the Works should be completed.

(*c*) Should the Works be delayed by any of the causes mentioned in Section (*b*) above, any extra costs or expenses which the Contractor has incurred, or which he may incur in consequence, shall be added to the Contract sum, and included in a certificate of the Architect.

Sub-Clauses (*a*) and (*b*) of this Clause are unusual only as regards the scope of the contingencies in the event of which the contractor becomes entitled to an extension of the time within which he must complete the contract. Compared with Clause 25 of the R.I.B.A. form, it will be seen that certain additional grounds are given to the contractor for requiring such an extension and, practically speaking, delay occurring from any cause "outside the contractor's control" is now a ground for a claim for such extension. This provision, having regard to war-time experience and the very serious shortage of skilled tradesmen in the building trade, will, for present-day building, be considered reasonable, although it is very much to be regretted that the contractors (who in the past have been as ready to guarantee expedition in the carrying out of the work as the efficiency of the work done) have found it necessary so to curtail their responsibility under the contract.

Sub-Clause (*c*), however, is quite another matter, as this makes the employer instead of the contractor liable for extra expenses due to delays caused for any of the reasons set out in sub-Clause (*b*). In considering the reasonableness or otherwise of such a Clause, a distinction must be drawn between risks and liabilities which are entirely unforeseen and cannot in any way be either avoided or contributed to by the contractor and those which, by his administrative skill, his wide experience and his knowledge of the labour and material market, he can avoid altogether or materially reduce. It appears to us that such risks are "shortage of local labour" or "delay or difficulty in obtaining special material or materials of unusual size or nature," and as such they are risks which the employer may prefer to pay the contractor to take, as distinct from risks, such as *force majeure*, Acts of Parliament and inclement weather.

The Clause generally is badly drafted, and it is unfortunate that the Federation has introduced an element of uncertainty by referring quite needlessly to particular Clauses in sub-Clause (*b*). As regards, for example, prevention by the employer of the contractor from proceeding regularly with the works: since Clauses 3 and 5 are specifically referred to in this connection it might reasonably be inferred that there was an intention on the part of the Federation to exclude, as a ground for extension of time, delay caused by such prevention in circumstances mentioned, for example, in Clause 1. Again, variations and extras to the works coming under Clauses 1, 6 and 31 being expressly referred to, it might be thought that variations coming, for example, under Clauses 25 and 28, were purposely omitted. The express reference in (*c*) to "Clauses mentioned in sub-Clause (*b*)" inferentially excludes reimbursement of the contractor for extra costs or expenses incurred in consequence of the events mentioned in paragraph (*a*). It may be that this is the intention of the Federation, having regard to the fact that strikes, lock-outs or trade disputes may in some degree be contributed to by the contractor and this view is corroborated by sub-Clause (*e*) of Clause 30. It should be noted that whereas sub-Clause (*c*) provides a certain remedy when expenses are occasioned to the contractor by, *inter alia*, failure on the part of the employer to deliver the site as arranged and prevention of the contractor from proceeding regularly with the works, another and entirely different remedy is provided to meet exactly the same sets of circumstances by Clause 29.

(*To be continued.*)

## The Use of Local Materials.

The desirability of alleviating unemployment in the building trade where it exists by encouraging local authorities to use stone for building purposes, thus providing work for stonemasons and labourers, and for quarrymen, was suggested in the House of Commons last week; and Mr. Munro (Secretary for Scotland) intimated that the Government was doing what it could in this direction. Where the cost of building in stone was reasonable in comparison with the cost of brick construction, it was the policy of the Government to give local authorities a full choice as to which they would use. Dr. Addison, Minister of Health, in reply, said that no such instruction had been issued, but obviously local authorities would not use the most expensive materials where others which were entirely satisfactory for their purpose could be obtained at a lower price.

# THE BUILDING TRADES EXHIBITION.

## EXHIBITIONS: THEIR HISTORY & PURPOSE.

The first modern exhibition was held in London in 1756, and was organised, like so many subsequent ones, by the Society of Arts, who offered prizes for improvements in the manufacture of tapestry, carpets, and porcelain. From that time, the exhibition became a recognised expedient for stimulating trade and commerce, both nationally and internationally, and a large number of exhibitions were held in various European towns. Of these, the next of great importance was the International Exhibition held in Hyde Park in 1851, in a huge building designed by Joseph Paxton—afterwards knighted—which was subsequently removed to Sydenham.

Paris then started a series of exhibitions. The first of any note was held in 1878, and resulted in the purchase by the city of the Palais du Trocadéro. In 1889, another exhibition was held in Paris, which marked a change of policy in the management of these gatherings, for the funds were contributed partly by the State and partly by the municipality of Paris. It was at this exhibition, too, that the Eiffel Tower constituted such a great attraction; a building which has since become famous as one of the most powerful wireless stations in the world. The fame of Paris as a centre for great exhibitions reached its height in 1900, when the largest exhibition until then held in Europe filled a great part of the city. The funds were raised in the same way as those for the 1878 exhibition; the Government and the municipality each subscribing. Many buildings were specially erected for the occasion, of which the most important survivals are the Petit Palais, designed by Charles Girault, and the Grand Palais, designed by Deglane, Louvet and Thomas. This building is still used for various trade exhibitions, and fulfils very much the same service to-day for Paris that Olympia does for London.

Meanwhile, as may be imagined, America was not altogether idle in the organisation of these gatherings, which were doing so much to stimulate trade in the various European countries, and in 1893, after much advertising, the great World's Fair at Chicago was opened. In the intervening forty years much had been done, but it remained for America to realise the full architectural opportunity which such an occasion afforded. The exhibition was promoted by a private company, but the Government at Washington voted £20,000 for the purpose of foreign exhibits, and £300,000 for the erection and administration of a building to contain exhibits from the various State departments. Those concerned with the organisation did not hesitate to consult with the best architects of the day, and so McKim and Burnham, Sullivan and Post were set to work to design a Horticultural Hall, a Women's Palace, a Machinery Hall, an Art Palace, and subsidiary buildings. From 1850 many designs which emanated from the Ecole des Beaux Arts found their way to America; it may be presumed that there was an unprecedented search for whatever could be turned to account in the production of the World's Fair buildings, and that these buildings became prototypes for most of the subsequent large exhibitions.

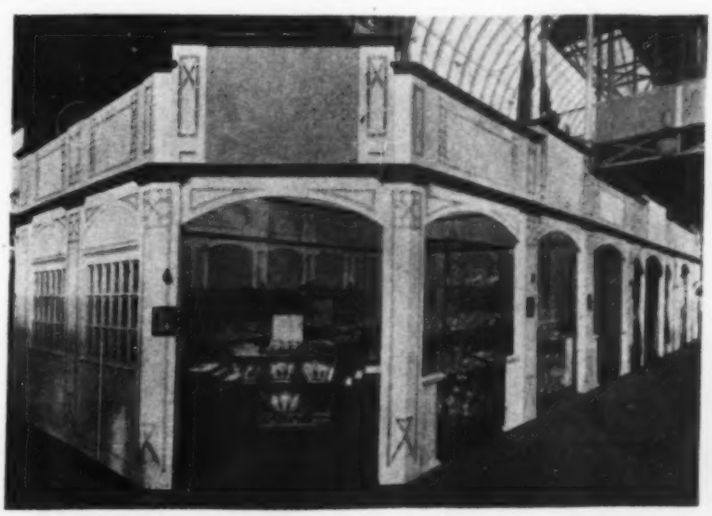
That there had been until the outbreak of war a constant succession of these enterprises should constitute in itself an evident proof of their success from the commercial aspect, and, indeed, this is not surprising, for where there is brought together and artistically arranged all the commodities which the ingenuity of mankind can conceive, the desire to purchase, either as a personal indulgence or as a speculation, is artificially stimulated, and where such exhibitions are of an international character the desire to emulate, to compete and to surpass induces each competitor to bring his goods to the highest pitch of perfection. Apart, however, from any artificial stimulus to purchase which such gatherings are apt to promote, they serve a very useful object in bringing together for comparison various articles, from one or from many countries, according to the nature of the exhibition, and the need which such an organisation fulfils in modern life tends to become ever more insistent. Only by some such means is it possible, except for those with much leisure at their disposal, to compare the various makes or brands of the same commodity which are produced by various manufacturers. The continual development of machinery tends to make the exhibition an indispensable part of the great process of interchanging goods.

The benefit to the exhibitor, also, should not be under-estimated, for not only is he afforded an opportunity of seeing the work of his fellow manufacturers, thus enabling him to assimilate new ideas, but if he be skilful he will be able to feel the needs of the public, and, to some extent, both satisfy and create demands.

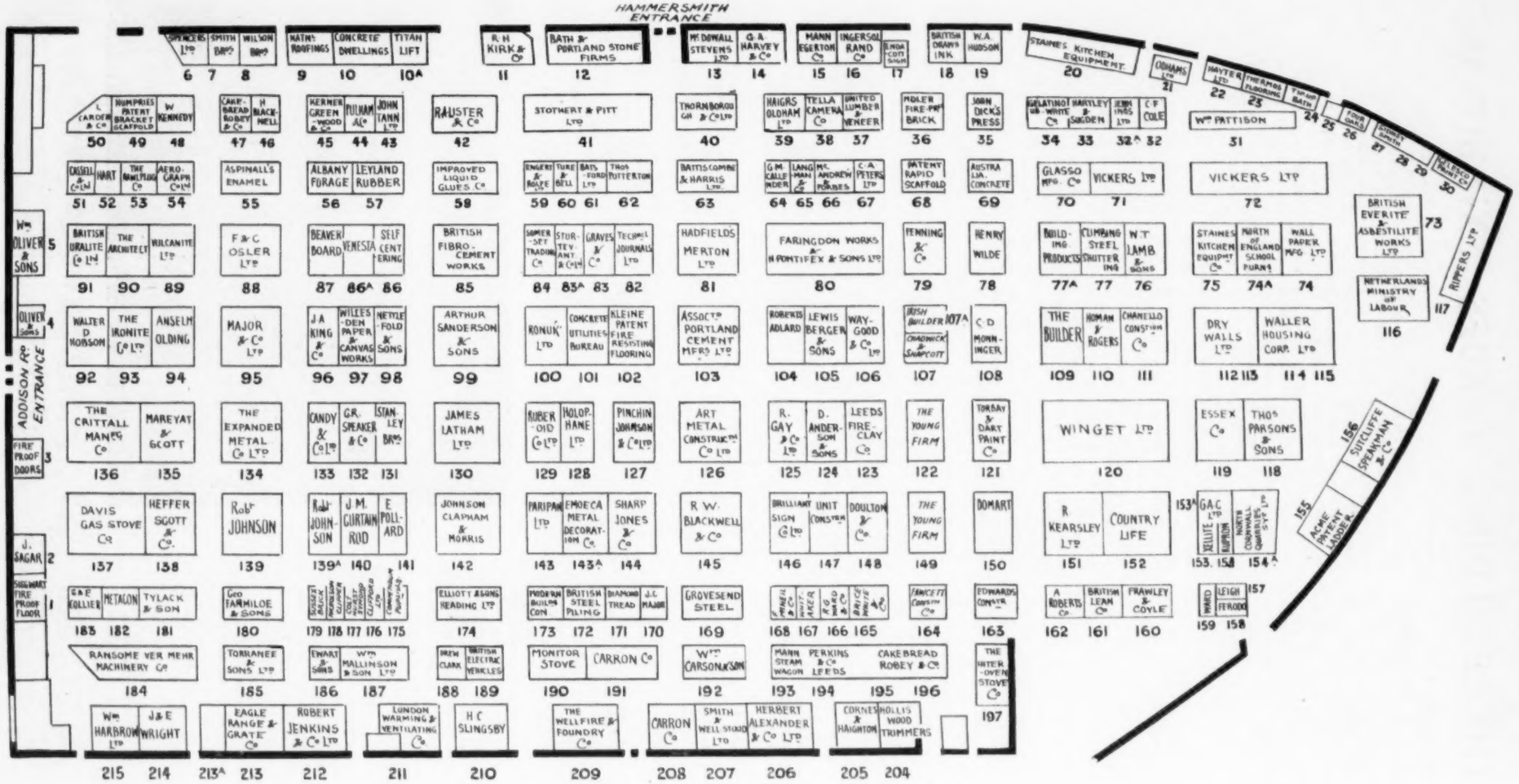
A general distinction between the large international exhibition and the trade or technical exhibition is that the former are of most use to merchants and wholesale tradesmen, whereas the latter tends to set up a more intimate relationship between the public and the manufacturers. To-day both are equally necessary. The national income is increased by export; it therefore becomes necessary to organise exhibitions to attract merchants and buyers from other countries. Such exhibitions are now being extensively organised, both at home and abroad, although not on the immense scale of the earlier exhibitions; such huge affairs take more time in organisation than it is at present possible to devote, seeing how urgent is the necessity for increasing trade and production and restoring confidence. It is interesting to note, however, how soon after the war of 1870 France was able to organise the largest international exhibition that had ever been held. Reference has already been made to the great exhibition of 1878. Indeed, as a restorative after a war the value of an exhibition cannot be too emphatically stated, and the more a particular trade may have suffered on account of the war, the more pressing is the necessity for organising some such opportunity for the interchange of new materials, inventions and ideas, and there is no trade on which the war has effected so much harm as on the building industry. It is not surprising, therefore, that the first post-war Building Trades' Exhibition is regarded as an event of considerable importance by the architectural profession, by the trade, and by the public, in all of whose interests it is that normal conditions should be restored as speedily as possible.

Since the last exhibition of 1914 many changes have occurred, but of these probably the most far-reaching and the most vital, yet by no means the best recognised, is the completely changed outlook of the public in the matter of building. This is due to the fact that housing has suddenly been lifted from the dim obscurity of pre-war days to the elevation of a great national problem, so that to-day there scarcely exists a parish in the whole of England or Wales which does not possess a committee of men and women interested in the latest improvements and devices which bear on any of the manifold aspects of housing. For such people the present exhibition will afford just that opportunity for which they have been so eagerly awaiting for inspecting all that has been produced in the feverish activity since the signing of the Armistice. The general public and the profession hope to see, properly set out and arranged for their inspection, samples of the various new materials and methods of construction which have been introduced within the past eighteen months, and all the new labour-saving devices for which, owing to the difficulty and expense of obtaining adequate domestic service, there is such a demand. As the available space in Olympia is very limited, it would seem that a considerable saving could be effected if the erection of individual houses were forbidden. To the architect they are of little value, and the public are fortunately still unwilling to purchase a house over the counter with as little ado as if it were a lawn-mower. If the building is to demonstrate a particular constructional method a small portion partially completed affords easier means for thorough examination.

Another useful purpose which it is to be hoped will be served by the Building Trades' Exhibition is that of restoring confidence among the public. There has appeared in the lay Press from time to time much nonsense concerning the high price of everything connected with building, and attempts have been made to attribute this to a variety of causes and individuals. Such a course is utterly inept. What the public requires to realise is that the increased cost of building is one of the many unpleasant results of a great war. The public will no doubt see in course of time that only with its co-operation will prices begin to assume a lower level, and if the Exhibition assists in bringing about such an enlightenment it will indeed have achieved a great purpose.



The above illustration shows the architectural treatment of four stands erected at the Crystal Palace for the recent British Industries Fair. The stands were designed and erected under the superintendence of the architects, Messrs. F. C. Mitchell, M.S.A., and A. F. Preston, Lic., R.I.B.A., 50, Moorgate-street, E.C. 2. The contractors were Messrs. Walter Lawrence & Sons, 19, Finsbury-square, E.C. 1.




Ground Plan of the Building Trades Exhibition at Olympia.

# BUILDING TRADES' EXHIBITION AT OLYMPIA.

**We give on this and the following pages particulars of some of the exhibits as a guide to visitors. Further notices will appear in subsequent issues. "The Builder" Stand (No. 109) will be found in Row F.**

### The Acme Patent Ladder Co.
### Stand 155, Row H.

The Acme Patent Ladder Co., of 364, Garratt-lane, Earlsfield, show models of portable scaffold tower platform ladders; a large variety of all types of telescopic ladders from 8 ft. to 60 ft. in two or three sections; a good assortment of builders' trestles, and steps; a sample of their improved trap-door fire escape ladders which comply with L.C.C. by-laws; and a large variety of builders' handcarts, trucks, trolleys, and barrows.

### The Adamite Co., Ltd.
### Stand 24a, Gallery.

The Adamite Co., of Regent House, Regent-street, W., are exhibiting samples of the American product known as "Anti-Hydro," a concrete hardener and waterproofer. The value of the material is demonstrated by small model tanks made with "Anti-Hydro."

### Aspinall's Enamel, Ltd.
### Stand 55, Row D.

Aspinall's Enamel, Ltd. (New Cross, S.E.14), show examples of "Sanalene" enamel, "Sanlac" gloss paint and "Wapicti" distemper, the stand itself being decorated throughout with these materials in various shades and finishes. All the painting has been done at the Exhibition, and the whole stand represents a practical example of modern decoration.

### Australia Concrete Block Machine Syndicate, Ltd.
### Stand 69, Row D.

The "Australia" hand concrete block-making machine manufactured by this firm is well known. The machine makes blocks 24 in. by 12 in., and from 2 in. to 5 in. thick. The blocks are moulded horizontally on pallets, and after being rammed with an automatic hand-worked rammer, the blocks are lifted from the mould on the pallet by a device actuated by the foot of the operator. For outside walls, the blocks are T-shaped, and by a simple adjustment to the hinged rammer, flat blocks for partitions, &c., may be produced. By means of different pallets a variety of face effects may be obtained. (Address: Salisbury House, E.C.)

### Joseph Aylott & Son.
### Stand 76, Row E.

Messrs. Aylott & Son (of Chadwell Heath, Essex) are exhibiting the "Aylott" cased frame window.

### Battiscombe & Harris, Ltd.
### Stand 63, Row D.

Messrs. Battiscombe & Harris, Ltd. (47–49 New Cavendish-street, W.1), architectural decorators, are showing specimens of their decorative work in fibrous plaster, carved wood and carton-pierre, including chimney pieces, electric light fittings, mirror frames, mouldings, &c.

### W. Bayliss & Co., Ltd.

Messrs. Bayliss (240 and 241, Dashwood House, New Broad-street, E.C.2) are exhibiting the "Bayliss" double portable pressure block-making machine; also concrete blocks and coke breeze partition slabs of all sizes and shapes as made on this machine, which is a pressure machine using two running mould boxes alternately.

### The Beaver Board Co., Ltd.
### Stand 87, Row E.

The Beaver Board Co., Ltd., are showing specimens of the well-known "Beaver" board for ceilings, panelling, &c. This boarding is made of wood fibre, and may be used in place of lath and plaster, or other usual finishings. With its use, wallpaper is unnecessary. The panels are made in various sizes and of a uniform thickness of about three-sixteenths of an inch.

### Lewis Berger & Sons, Ltd.
### Stand 105, Row F.

Messrs. Lewis Berger & Sons, Ltd. (Homerton, E.9), show four rooms in miniature decorated in accordance with colour schemes prepared by the Berger Decorative Service; with ceilings and walls in Matone flat oil paint, and woodwork in Enamelac white enamel and scrumble graining colour under Berger varnish. There is a Futurist drawing room scheme, a Jacobean hall, a dining room, and a children's nursery. All the decorative schemes embody applied stencils from the Berger range of registered stencil designs. Apart from the four specimen rooms there is a general exhibit, showing how Berger paints and varnishes are used for finishing omnibuses, motor cars, etc. Berger materials will be demonstrated on the Exhibition stand daily by a practical painter.

### Robert W. Blackwell & Co., Ltd.
### Stand 145, Row H.

Messrs. Blackwell (36, Emperor's Gate, S.W.7) are showing their self-finished bitumen roofing felt and bitumen underslating.

### The Brilliant Sign Co., Ltd.
### Stand 146, Row H.

The Brilliant Sign Co., Ltd. (38, Gray's Inn-road, London, W.C.1), are exhibiting the Brilliant letter, which is used for large facias, hanging signs, stall plates, tablets, etc. The firm are also showing their new "Permenart" fired-in background, gilt wood letters, show cases, counter cases, wall cases, etc., and a special feature is a model of their factories.

### British Electric Vehicles, Ltd.
### Stand 189, Row K.

The exhibit of this firm (Churchtown Works, Southport) consists of one of their "Giant" model electric trucks, and one of their electric locos, 10-ton size, which is capable of hauling a load of 10-tons on the level.

### British Fibro-Cement Works, Ltd.
### Stand 85, Row E.

The company (of Erith, Kent) manufactures "Fibrent" asbestos cement slates, and flat and corrugated sheets for all roofing and partition work, and their stand has been especially designed to illustrate the various manufactures. The south side of the stand is covered with "Fibrent" corrugated sheeting, and the north side with "Fibrent red slating. These slates are also made in grey, blue-black, and purple. The external treatment shows the use alternatively of "Fibrent" flat sheeting, plain or rough cast, scalloped sheeting or corrugated; the interior shows the use of flat sheeting, and the several finishing methods that may be adopted. "Fibrent" flat sheets, ¼ in. thick, are used on the floor, fixed direct to joists.

### The British Roofing Co.
### Stand 9, Row B.

The stand of the British Roofing Co., of 150, Southampton-row, W.C.1, contains specimens of "Alligator" corrugated and flat asbestic slate and asbestic tiles. The tiles are made in all standard sizes, and in grey, red and blue colours; the thickness is about 5/32 in. The sheets are made in various sizes and up to 1 in. in thickness.

### The British Steel Piling Co.
### Stand 172, Row J.

The British Steel Piling Co., of Dock House, Billiter-street, London, E.C. 3, exhibit sections of steel sheet piling, a model of the McKiernan-Terry automatic piling hammer, a small petrol-driven concrete mixer and a petrol-driven winch, together with a large number of photographs, showing some works carried out with their piling during the war.

### G. M. Callender & Co., Ltd.
### Stand 64, Row D.

"Callendrite" sheeting, shown by this firm (25, Victoria-street, S.W.1), is a waterproofing medium for open and covered reservoirs, filter beds, swimming baths, lakes, ponds, etc. The exhibit shows a model reservoir with sloping sides lined throughout with "Callendrite" sheeting. In the centre of the reservoir is a column of loose porous bricks under the top course of which, just above water level, is inserted a piece of "Callendrite" dampcourse. "Ledkore" dampcourse, also shown, is a core of sheet lead with a special bitumen covering both sides. A wall is exhibited showing the application of "Protex." There are also shown samples of paint for iron and steel work, a self-finished roofing material, roofing felt, insulating paper, and asbestic-bitumen cement.

### Candy & Co., Ltd.
### Stand 133, Row G.

Messrs. Candy & Co., Ltd., (87, Newman-street, Oxford-street, London, W.) exhibit their Devon fires, which were placed first in the official tests carried out at the Government offices jointly by H.M. Office of Works and the Smoke Abatement Society. They also show a selection of their other manufactures, including wall tiling, paving bricks, fire-bricks, and their "White City" paving tiles.

### Walter Carson & Sons.
### Stand 192, Row K.

Messrs. Walter Carson & Sons, of Battersea, are showing their various paints and specialities. They are making a special feature of the different covering power, and the effect of each successive coating, of their various manufactures on panel doors and sections, which illustrates the finished painted surface, and shows how that finish has been obtained.

### The Channello Construction Co.
### Stand 111, Row F.

The Channello Construction Co., of 8, Warwick-street, W.C.1, are showing a house built on the "Channello" system of construction. The house is constructed of standard-size concrete blocks for walls, roof and floors, the edges of the blocks being grooved to ensure good joints. This system has been approved by the Ministry of Health for use in connection with housing schemes.

### The Climbing-Steel Shuttering Co.
### Stand 77, Row E.

This firm (575, Queen's-road, Sheffield) exhibits a method of concrete wall construction whereby a single row of patent shuttering plates will build a wall any height and any thickness. The plates have a face both sides, and are made to climb or revolve up the wall as each layer of concrete is filled in.

### Mr. C. F. Cole.
### Stand 32, Row C.

Mr. C. F. Cole, of Alperton, Middlesex, is exhibiting the "Winch" concrete block-making machine.

### Concrete Utilities Bureau.
### Stand 101, Row F.

The Concrete Utilities Bureau, of 35, Great St. Helens, E.C.3, have a display of pamphlets dealing with the uses of concrete, together with the volume "Concrete Cottages, Farm Buildings and Small Garages," by Mr. Albert Lakeman, M.S.A. Consultations will also be held daily on subjects relating to the employment of concrete for a variety of purposes.

### Davis Gas Stove Co., Ltd.
### Stand 137, Row H.

A varied assortment of apparatus, including gas cookers, gas fires, geysers and other water heaters, and also a combined coal range and gas cooker, are shown by this firm (60, Oxford-street, W.1). The "N.H" interior fire has been specially contructed for national housing schemes, and is displayed in conjunction with the "Nautilus" flue.

### Doulton & Co., Ltd.
### Stand 148, Row H.

The exhibit of Messrs. Doulton (Lambeth, S.E.) consists of a representative selection of sanitary fittings, contained in five specimen bath-rooms, comprising shower and plunge baths in white porcelain enamel finish; marble

and earthenware lavatories, w.c. suites, towel rails, bidets, mirrors, and a variety of other bath-room accessories; and valves or taps for baths, lavatories and sinks, in white porcelain enamel finish. These eliminate the use of metal polish, with a resultant saving of labour. The five bath rooms are decorated in various styles to suit all tastes. There are also shown a drinking fountain with bubbling jet; a w.c., with silent flushing valve instead of cistern; a closet with raised side pieces (suitable for factory use); a w.c. with chair over; clip connections for w.c. inlets; ball valve with adjustable ball; and a patent "Duplex" swivel bath tap, which can be swung over edge of bath.

**Drew, Clark & Co.**
**Stand 188, Row K.**

This firm (Diamond Ladder Works, Leyton) is exhibiting a selection of "Diamond" ladders.

**"Dry Walls," Ltd.**
**Stands 112 & 113, Row F.**

This firm (168, Regent-street, W.1), is demonstrating its method of poured concrete walling, with a central vertical damp course.

**Egbert & Rolfe, Ltd.**
**Stand 59, Row D.**

Messrs. Egbert & Rolfe, Ltd. (Poplar, E.), show specimens of self-finished roofing felts for external covering purposes. "Trinda" bitumen dampcourse is also shown, and is of the standard as approved by the Ministry of Health for housing schemes. Other features are the "Lim-a-Lith", combined system of sheet asphalt with rock mastic asphalt upper layers, and a system of rock mastic asphalt to take the place of sheet metal for lining box and valley gutters, dormer checks, tanks, &c.

**The Emdeca Metal Decoration Co., Ltd.**
**Stand 143a, Row H.**

The Emdeca Metal Decoration Co., Ltd. display their "Emdeca" wall tiling and enamelled embossed zinc sheets for wall or ceiling coverings. A large variety of patterns are made, and several combinations and panels are being shown, including a mosaic panelling scheme.

**Ewart & Son, Ltd.**
**Stand 186, Row K.**

Messrs. Ewart & Son, Ltd. (346–350, Euston-road, N.W.1) exhibit the following:—"Lightning," "Victor," and "Royal" geysers, baths and lavatory basins, "Emperor" and "Empress" smoke cures; "Victoria," "Empress" and "Standard" ventilators; roof lights and galvanised iron coppers. The firm's special housing scheme exhibit shows the "Industria" water heater, to supply bath, sink and lavatory basin; "Ewart's" basin bath (combined lavatory basin and bath to save space and plumbing work); gas copper with 10 gallon copper pan, and patent sanitary dustbin. The "Industria" has been recently introduced to meet the demand for hot water installation to bath and sink at a low first cost.

**The Expanded Metal Co., Ltd.**
**Stand 134, Row G.**

This exhibit consists of photographs of various works carried out on the company's systems and samples of various products, amongst them being: Diamond mesh expanded steel sheet reinforcement for concrete roads, foundations, walls, floors, roofs, bridges, culverts, &c.; expanded metal lathings, both for interior and exterior plaster work; "Exmet" reinforcement for brickwork, concrete blockwork, partition slabs, asphalt, &c.; twisted and set steel wall-ties for cavity walls; and sections of reinforced concrete flooring, solid and hollow partitions, and reinforced brickwork.

**George Farmiloe & Sons, Ltd.**
**Stand 180, Row J.**

Messrs. George Farmiloe & Sons, Ltd., of 34, St. John-street, E.C.1, have used "Father Thames" white-lead paint and "Eskimo" leadless white paint (for interior use) in the decoration of their stand. They also show "Zingessol" water paint, and tint cards and books are available. Several descriptions of glass are shown, and specimens of painting brushes. Other exhibits include sheet lead, plastic waterproof compound for repairing zinc, lead, asphalt and tiled roofs, &c.; wrought iron casements and leaded lights; porcelain enamelled cast-iron baths; the "Bedford" lavatory, with accessible overflow; towel airers, and a collection of bath-room accessories.

**Herbert Fender & Co.**

Messrs. Fender (329, High Holborn, W.C. 1) are showing their "Recelt" and "Kelasto" preparations. The "Recelt" preparation is for the purpose of making it possible to store animal, vegetable or mineral oils in concrete containers. "Kelasto" enables acids or admixtures of acids to be similarly stored. The preparation is impervious to water, either salt or fresh.

**Ferodo, Ltd.**
**Stand 168, Row J.**

The stand of Messrs. Ferodo, Ltd. (Chapel-en-le-Frith), is devoted entirely to the display of Ferodo stair treads, made from the fabrics that for over twenty years have been in use as brake and clutch linings on railways and motor vehicles. These stair treads are claimed to possess three times the durability under rubbing friction of cast iron, and to present a better gripping surface than rubber. Amongst other advantages possessed by these treads is that, having a cotton base, they act as a pad and deaden the noise of the foot on the stairs. They are moulded to fit the nosing of any staircase, the nose part being flanged to allow of a perfect joint being made with carpet, linoleum or strips of "Ferodo" material. Many large staircases have been fitted with Ferodo nosings, and strips of linoleum or carpet, which do away with material on the riser of the stairs.

**The Gelatinous White Co., Ltd.**
**Stand 34, Row C.**

The Gelatinous White Co., Ltd., (Harefield, Middlesex), exhibit Filocol distemper in paste in four light shades, specially made for ceilings, Filocol distemper in colours in 72 standard tints for wall and freize decorations, and dry Filocol in powder form for all climates and export. The exhibit also includes putty, whiting, lime, &c.

**General Trading & Manufacturers, Ltd.**

This company (of 6, Market-street, S.E.1), is exhibiting the "Ventiheta," a gas heater for warming rooms. Air is automatically drawn into the apparatus, warmed, and distributed. The gas consumption is stated to be 5 cub. ft. per hour, and it is claimed that an average-size room can be kept comfortably heated for 24 hours at a cost of 6d.

**Graves & Co., Ltd.**
**Stand 83, Row E.**

This firm (Finsbury-court, E.C.) is exhibiting various models, showing the application of Graves' patent roofing on various types of buildings, such as dock sheds, factory buildings, flat roofs, &c. This material, which is the original Danish asphalt, has been manufactured by the firm for the past 40 years, and forms a permanent and economical fire-resisting roof covering. The firm is exhibiting examples of "Duroid," which is a smooth-faced roofing, and also "Tectite" roofing, suitable for more or less temporary structures.

**Hadfields (Merton), Ltd.**
**Stand 81, Row E.**

The stand of this firm (63, Regent-street, W. 1) takes the form of a pagoda of Chinese design and colouring, showing the effects which can be produced by using "Heolin" paints, varnishes, &c.

**Haighs (Oldham), Ltd.**
**Stand 39, Row C.**

Messrs. Haighs (Oldham), Ltd., of Globe Iron Works, Oldham, are exhibiting a combined vertical spindle moulding and recessing machine; vertical spindle moulding machine; surface planer with circular cutter-block and ball bearings; woodworker for surface planing, thicknessing, moulding, circular sawing, mortising and boring, and hollow chisel work, etc.; three-cutter planing machine; four-cutter planing and moulding machine; dimension saw bench, single spindle; automatic dovetailing machine; combined chain and hollow chisel mortising machine; chain mortising machine; automatic plane-iron grinding machine, fitted with circular saw sharpening attachment; vertical boring machine; automatic band saw filing and setting machine; bench band saw filing and setting machines; wide band saw sharpening machine; wide band saw rolling machine; rising table saw bench; steam glue heater; lathe headstocks; hand-feed rounding machines; and various saw spindles, cutter balancing scales, etc.

**Hartley & Sugden, Ltd.**
**Stand 33, Row C.**

Messrs. Hartley & Sugden, Ltd., of Halifax, exhibit boilers and heating appliances. The combination "Heatanbake" boiler, model 1, comprises a wrought steel oven and a wrought steel welded boiler, the remainder of the combination being in cast iron and firebrick. The oven is heated by direct fire, and measures 15½ in. by 16½ in. by 15½ in. Model 2 is the same as model 1 in appearance and dimensions, but in addition a separate boiler is fitted in the firebox for central heating. The bottom door forms a support for flat irons, &c., and a loose trivet can be fitted to the front grate. The "Reliance" wrought steel sectional boiler, which is also shown, is made in seven sizes, from 1,290 to 2,820 sq. ft. direct radiation. The entire heating surface is arranged vertically, which makes it possible to arrange access to flues so that every part may be kept clean. The "Saxille" combination boiler comprises a copper corrugated cylinder fixed inside a wrought steel boiler, made in seven sizes, with a range of 104 to 350 gallons of water heated per hour to 100 deg. Fahr. The "Beacon" domestic hot-water supply boiler No. 1 is designed for installations where only small quantities of water are required. The No. 2 size supplies 72 gallons per hour at 100 deg. Fahr. For central heating by hot water the "Municipal" boiler has been designed. This is made in eleven sizes, with a range of 1,080 to 3,350 sq. ft. radiation.

**G. A. Harvey & Co. (London), Ltd.**
**Stand 14, Row B.**

The following are the chief articles shown on the stand of Messrs. G. A. Harvey & Co. (Woolwich, S.E.7): Inlet and outlet ventilators, perforated brass and copper for radiator covers, grilles, &c., tanks with patent "Harco" manhole, and steel lockers and shelving.

**Heffer, Scott & Co., Ltd.**
**Stand 138, Row H.**

The principal items on this stand are a display of Chinese lacquer papers, several new designs in hand-made wall papers, and an exhibit of "Keystona" washable paint. Messrs. Heffer, Scott & Co.'s address is 56, Berners-street, W.1.

**The Hollis Wood Trimmer Co.**
**Stand 204, Row L.**

This firm (of Imperial Works, Jockey-road, Wylde Green, Birmingham) is exhibiting wood trimmers, 8 in. and 10 in. "Imperial" saw tables, and 16 in., 20 in., 30 in. and 36 in. "Kingsway" saw benches.

**Holophane, Ltd.**
**Stand 128, Row G.**

The exhibit of this firm (12, Carteret-street, Queen Anne's Gate, S.W.1) consists of scientifically designed prismatic illuminating glassware for the correct light distribution and diffusion of modern electric lamps. The types of glassware exhibited can roughly be divided under three heads, i.e., reflectors, diffusers, and refractors. The special units shown include: Concentrating angled reflectors for shop window lighting, "Decolite" units for decorative semi-indirect lighting, satin finished prismatic bowls for semi-indirect lighting, "Excellite" prismatic units for interior lighting, reflector-refractors for interior lighting, and Holophane anti-glare motor headlight lenses.

**W. A. Hudson, Ltd.**
**Stand 19, Row B.**

W. A. Hudson, Ltd., of Curtain-road, E.C., and Birmingham, are showing a new patent picture moulding. It is called "Radford Patent Hygiene Moulding," its object being to prevent dust accumulating at the top of the moulding. This is done by the top being made to slope down, the picture being suspended from a hook which is fixed over a piece of metal let into the bottom of the back of the moulding. These hooks run on the metal; can be moved to any position, and will hold any size picture, the advantage claimed for the patent being that it dispenses with the groove at the top of the moulding which cannot easily be dusted. The firm are also showing several lines in casement rods and fittings, a variety of wood and brass stair rods, including two new patent stair eyes which have only just been put on the market. Stair nosings in several patterns are also to be seen.

**The Improved Liquid Glues Co., Ltd.**
**Stand 58, Row D.**

The Improved Liquid Glues Co., Ltd. (Great Hermitage-street, London, E.1), are exhibiting the "Croid" liquid glues in various forms for end grain work and other special purposes, for joinery, cabinet making, veneering, lino laying, and for aircraft construction. A machine for testing the strength of glued joints is also shown. Demonstrations are to be carried out during the exhibition on joints made on wood, leather and other material.

**Ingersoll-Rand Co.**
**Stand 16, Row B.**

The Ingersoll-Rand Co. (165, Queen Victoria-street, E.C.), show a cement-gun actually at work at stated periods daily. The stand itself was largely constructed by the cement-gun. A portable air-compressor plant, and other appliances necessary for the use of the cement-gun under ordinary conditions are also exhibited.

**The Interoven Stove Co., Ltd.**
**Stand 197, Row K.**

The Interoven Stove Co., Ltd. (156, Charing Cross-road, W.C.2) are exhibiting their well-known "Interoven" convertible stove and the "Bewty" expanding barless fire front.

**The Ironite Co., Ltd.**
**Stand 93, Row F.**

The Ironite Co., Ltd., 11, Old Queen-street, Westminster, S.W.1, have the following exhibits: "Ironite" for dustless, waterproof and grease-proof floors for factories, garages, dairies, dock quays, machine shops, warehouses, gas works, power stations, etc.; "Ironite" and Portland cement slurry, applied with a brush for waterproofing walls and roofs of breeze blocks, concrete, brickwork, etc.; "Ironite" waterproofing, for use with water only, without any cement, for rendering heating chambers, basements, wells of lifts, reservoirs, etc., water-proof and oil proof; "Aero" blocks—patent improved 2 or 3 cavity building blocks with continuous ventilation, both horizontal and vertical; "Aero" cavity block-making machine.

**J. Jackson, Ltd.**

This firm (Bramley, Surrey) shows the "Day-dawn" washerless taps and ball valves. These taps are of a new pattern, and are claimed to be practically indestructible. The closure member is operated on the inlet side, and is semi-automatic.

**Robert Jenkins & Co., Ltd.**
**Stand 212, Row L.**

Messrs. Jenkins (Rotherham) are showing the "Eco" combined hot water and gas stove. This apparatus, together with the "Kalor" hot-water supply boiler, will be in use during the period of the Exhibition. There are also exhibited copper and wrought iron range boilers, and copper cylinders.

**Robert Johnson & Co. (Leicester), Ltd.**
**Stands 139 & 139A, Row H.**

This firm (London-road, Leicester) shows a panelled mahogany dining room in the Georgian style completely furnished and fitted *en suite*. The panelling, in Cuban mahogany, dull polished, is the full height of the room with carved cornice, dado and plinth mouldings. The chimney-piece has carved and fluted pilasters with marble moulded slips, and the ceiling decoration is in plaster in the Georgian style. Stand 139A contains two bedrooms completely furnished with flat enamelled furniture.

**Johnson's Reinforced Concrete Engineering Co., Ltd.**
**Stand 42, Row H.**

Messrs. Johnson's Reinforced Concrete Engineering Co., Ltd., of Lever-street, Manchester, are displaying their specialities of reinforcements—the "Lattice" and "Keedon" system of reinforced concrete construction, and "Bricktor" reinforcement for brickwork.

**Robert Kearsley & Co., Ltd.**

The exhibit of Messrs. Robert Kearsley & Co., Ltd., of 346, Strand, W.C., represents a Greek temple with forecourt. In the front is a semi-circular colonnade of the Doric order, with a small circular domed temple in the centre. The woodwork has been prepared and finished throughout with the firm's materials, the main walls of the temple being finished with "Arkalac" flat enamel and the columns with gloss enamel. On the stand are shown panels painted with specimens of colours, and finished with a special decorator's varnish, "Kapitia." There are also panels showing ready mixed colours in "Arkaduro" protective paints.

**Kerner-Greenwood & Co., Ltd.**
**Stand 45, Row C.**

Messrs. Kerner-Greenwood & Co., Ltd. of King's Lynn, exhibit their cement water proofer "Pudlo." The exhibits consist chiefly of apparatus and models which demonstrate the practical application of "Pudlo," and comprise the following:—(1) Apparatus for testing the resistance of cement permeation by water under pressure. This apparatus is similar to that in use at their works for making the daily tests. (2) Full size section of solid concrete floor with 1 in. "Pudloed" cement topping, the lower edge of the concrete being immersed in water, and the upper surface treated with "Pudlo" to show how it keeps down rising dampness. (3) Short length of stoneware drain-pipe charged with water. The joints are made with 3 parts of sand, 1 part of Portland cement, and "Pudlo." (4) Water tank constructed of thin porous concrete blocks to which a ½ in. facing of "Pudloed" cement has been applied during the process of manufacture. There are also showing "Pudloed" concrete tanks, damp-courses, etc., and details of the application of "Pudloed" cement to the cure of flooded cellars, damp walls, etc. The firm display some of the original sketches for their advertisements, including those by the following artists: Chas. Shepperson, R.A., Stephen Reid, R.E., H. M. Brock, R.I., L. R. Squirrell, R.E., Oswald Cunningham, James Guthrie, and Mrs. Nesbit.

**The Kleine Patent Fire-Resisting Flooring Syndicate, Ltd.**
**Stand 102, Row F.**

The Kleine Patent Flooring Syndicate, Ltd., of 133 to 136, High Holborn, London, W.C. 1, show their well-known floor and roof construction, and, as a novelty, reinforced hollow brick beams, which are designed for the construction of floors where timber centering cannot advantageously be used.

**C. W. Langman, Ltd.**
**Stand 65, Row D.**

Messrs. Langman, of Shaftesbury-road, East Ham, demonstrate a composition flooring. The composition may be laid in one layer ½ in. thick on concrete, or ¾ in. thick on wood. This flooring prevents the accumulation of dust, and is supplied in many colours and designs.

**James Latham, Ltd.**
**Stand 130, Row G.**

Messrs. James Latham, Ltd., timber and veneer merchants, 124, Curtain road, E.C. 2, are showing examples of timbers, including mahogany figured boards, planks and veneers, and oak boards, planks and squares. Samples of English wainscot are shown, and also samples of teak, walnut, 3-ply panels, mouldings in hard and soft wood, and floorings and matchings in oak, teak, maple, &c.

**The London Warming and Ventilating Co., Ltd.**
**Stand 211, Row L.**

Exhibits of the London Warming and Ventilating Co., Ltd., 20, Newman-street, W., include the "Kooksjoie" anthracite range—which is made in 11 sizes and burns all fuels—and the "Wifesjoie" one-ring gas cooker. This cooker is adaptable to either gas or oil. The "Florence" boiler-grate, which is specially constructed for anthracite and continuous-burning, and has a boiler, is also shown. A newly-designed range, the "Dulce Domum," is exhibited. A variation of the design of this range has been named the "Dora," and includes either one or two boilers (one serving radiators), as required, and a separate slow-combustion fire below the range fire, let through from the ordinary firebox when cooking is finished.

**MacAndrews & Forbes, Ltd.**
**Stand 66, Row D.**

Messrs. MacAndrews & Forbes, Ltd. (2, Broad-street-place, London, E.C. 2) are showing the effect of the Fiberlic wallboard. The firm's stand shows the interior of a modern room the walls and ceilings of which are lined with Fiberlic and painted a biscuit colour, the whole showing the effect that may be obtained with this material.

**F. McNeill & Co., Ltd.**
**Stand 168, Row J.**

This firm shows rolls of all kinds of felts for exterior roofing, underslating, lining and sound-deadening purposes, &c., including "Lion" roofing, which is manufactured in rolls 24 yards by 1 yard. Models show the application of the "Combinite" system of roofing, and Mansard, flat, north light and Belfast roofs are shown covered with suitable roofings. A model is also exhibited showing the uses of "Slagbestos," which is claimed to be fireproof, sound proof and vermin-proof, and a non-conductor. Many samples of dampcourses, bitumen sheeting and pipe coverings are also shown

**Major & Co., Ltd.**
**Stand 95, Row F.**

Messrs. Major & Co., Ltd. (Hull), are occupying their usual space for Solignum wood preservative and stain. The stand erected shows the use of Solignum as a preservative and stain for outdoor wood work and for interior decoration. Solignum is shown in various colours.

**Mann's Patent Steam Cart and Wagon Co., Ltd.**
**Stand 193, Row K.**

This firm (Hunslet, Leeds) exhibits a 3-ton steam tipping wagon. The fire door and foot plate are at the side of the boiler instead of at the back, and the driver has no difficulty in attending to his own firing.

**Mann, Egerton & Co., Ltd.**
**Stand 15, Row B.**

Messrs. Mann, Egerton & Co., Ltd., of Norwich and London, are exhibiting complete electrical plant for country and farmhouse use. Not only does this plant provide for lighting and heating, but also allows for power for pumping, and the use of domestic electrical labour-saving appliances, such as electric irons, kettles, fans, hot plates, percolaters, &c.

**Marryat & Scott, Ltd.**
**Stand 135, Row G.**

Messrs. Marryat & Scott, Ltd. (28, Hatton-garden, E.C.) exhibit a complete electric service lift, adaptable for hotel, restaurant or private house use operating under actual working conditions. A passenger lift car—the firm's standard "Osborne" type—is exhibited to demonstrate the action of the passenger safety gear. The car is shown fully loaded supported by this safety gear. A range of standard controlling equipment, including safety lift locks, passenger and service type gears, and controllers are shown.

**The "Metacon" Patent Glazing Bar Co., Ltd.**
**Stand 182, Row J.**

This firm (124, Chancery-lane, W.C.2) is exhibiting a model showing the "Metacon" system of puttyless glazing, and has glazed the roof of the stand on one side with "Metacon" deal bars, and on the other side with "Metacon" concrete bars.

**The Ministry of Labour.**
**Stand 193, Row K.**

This exhibit is a demonstration of work by disabled sailors and soldiers who have been trained by the Ministry at the L.C.C. School of Building at Brixton. A large number of these men have already been trained for work in architects' and builders' offices, and for the various allied trades, and many have been placed in positions. Others are now finishing their period of training, and the assistance of the architectural profession and building industry in placing them in work is solicited.

**The Modern Building Co.**
**Stand, 173, Row J.**

The exhibit of the Modern Building Co. (Brighton) takes the form of a garden arbour of timber framing covered on the exterior with "Doric" patent weatherproof rough cast building sheets, with overlay bands giving the effect of a half timbered and rough cast building. The interior is lined with asbestos-cement sheets panelled out and distempered, the roof covered with "Doric" patent roofing, and on the underside the exposed rafters are stained in keeping with the panelled walls. This exhibit illustrates the "Doric" timber frame system of construction. The firm also has sections of "Doric" concrete construction as approved by the Ministry of Health for State-aided housing schemes.

**C. D. Monninger, Ltd.**
**Stand 108, Row F.**

Messrs. C. D. Monninger, Ltd., 59, Farringdon-road, E.C., show a selection of wood cutting saws, namely, band, circular, frame and horizontal. They also show their "Climax" improved circular safety cutter block, with three knives and instantaneous adjustment for the knives. They have on exhibition guards for circular saws, spindle moulding machines, planing machines, &c., and also show a selection of wood boring and mortising bits and plane irons and moulding irons, &c.

**North Cornwall Quarries Syndicate, Ltd.**
**Stand 154a, Row H.**

The exhibits of this firm (Sicilian House, Sicilian-avenue, W.C.1) consist of a roof covering the whole of their stand, measuring 20 ft. by 20 ft. of Cornish rustic slates. In addition they are showing the effect of the use of rustic slates in laying out courtyards and gardens. At the same stall are two other exhibits, first by the Coal Saving & Smoke Consuming Co., of Oldbury, and the second by the Sleaford Brick Co., of Sleaford, Lincs, who exhibit specimens of their engineering and other bricks and land drain pipes.

**North Wales Slate Quarries.**

The North Wales Slate Quarries, Bangor-street, Carnarvon, are showing a selection of Welsh roofing and other slates.

**J. Sagar & Co., Ltd.**
**Stand 2, Row A.**

This firm, whose address is Canal Works, Halifax, shows several types of wood-working machinery, including the "Premier" combined hand and roller feed surface planing, thicknessing, moulding, &c., machine, a tenoning machine, a semi-automatic chain-cutter and hollow chisel mortising and boring machine, a heavy vertical spindle moulding and shaping machine, a dimension sawing machine, a four-roller bearing, moulding and planing machine, a planing and moulding cutter, grinding machine, an automatic dovetailing machine, a circular saw bench, a band-sawing machine, a mitreing and trimming machine, a small vertical spindle moulding and shaping machine, and a sand-papering machine.

**Thos. Parsons & Sons.**
**Stand 118, Row G.**

Thos. Parsons & Sons (315 and 317, Oxford-street, London, W.1) exhibit a model, H.M.S. *Endelline*, showing some practical examples of their enamels, paints and varnishes, including Endelline (gloss enamel), Endelflat (flat enamel), their undercoating body white paint, Unicote (flat wall finish), and floor varnish. The firm also exhibit panels showing various paints, enamels and varnishes suitable for the building and allied trades. Their invention, "Parsons Colourmeter," which will produce any shade of colour, is also on view.

**Perkin & Co., Ltd.**
**Stand 194, Row K.**

This firm is exhibiting saw benches with fixed and rising tables, band saws, vertical spindle moulders and planing machines, and a bench type planer made in two sizes for widths of 4 in. and 9 in. respectively. The machine is intended for repetition work, or to relieve the larger machines in a workshop by taking all the smaller stuff.

**The Phœnix Engineering Co., Ltd.**

The Phœnix Engineering Co., Ltd. (Chard), are showing their manufactures in the Gallery.

**Pinchin, Johnson & Co., Ltd.**
**Stand 127, Row G.**

The exhibit of Messrs. Pinchin, Johnson & Co., of Silvertown, is designed on the lines of Trafalgar-square, consisting of the main structure guarded by four recumbent lions and mounted with a classical column, which is in turn surmounted by a globe. Upon this is given a practical illustration of the results produced by some of the protective finishing and decorative materials manufactured by this firm. Some plaster panel screens show the texture and colour schemes possible with the use of "Deydol" distemper. The interior of the main structure forms a room, the panelling of which shows the effect obtained with the firm's stains, whilst the doors display samples of varnishes. There are also separate exhibits for iron paints, preservatives, lacquers, stains &c.

**Pollard & Co., Ltd.**
**Stand 141, Row H.**

Messrs. Pollard & Co., Ltd., of 29, Clerken-well-road, E.C.1, are showing various examples of their patent "Kwikserving" fixtures, and also patent "Kwikserving" counters and examples of metal works, such as caps and bases, drawn and extruded metal work for shopfronts, sashes, door frames, &c., together with facias with both incised and brilliant letters. Models are shown of shutters, both wood and curvilinear, and all types of shop blinds and house blinds.

**H. Pontifex & Sons, Ltd.**
**Stand 80, Row E.**

This firm is exhibiting examples of sanitary fittings, comprising baths, lavatory basins, closet combinations, sinks, slop hoppers, &c., and is giving a special exhibition of waterproof roof-covering material. There is also shown a bath having a rounded roll and a continuous base cast in one piece with the bath, and baths fitted with combined easy-cleaning fittings. These baths have the valves in rough brass placed immediately under the roll at the foot end. The delivery nozzle from the valve is made in porcelain-enamelled iron, the overflow and outlet fittings are of the same material, and the valves are worked by porcelain enamelled cross handles on the roll. There is a special display of marble lavatories, and also cheaper lavatories for housing schemes. "Masticon" roofing material is also shown.

**Mr. Thomas Potterton.**
**Stand 62, Row D.**

Mr. Potterton, of Ravenswood-road, Balham, S.W., specialises in hot water supply, heating and allied equipment for all kinds of buildings. This exhibit includes a selection of "Victor" gas boilers, with a working example of automatic hot-water supply for domestic use, together with a system of circulation with radiators heated by gas upon the low-pressure principle, having the means of automatic control of gas consumption operated by the temperature of the atmosphere in the room. Thermostats, both water-controlled and air-controlled, are in operation, and sectional boilers for solid fuel and radiators for central heating, coke or anthracite boilers for domestic hot water service, and "Zigzag" hot-water supply range boilers, are also shown.

**Ransome-verMehr Machinery Co., Ltd.**
**Stand 184, Row K; and 26 in Gallery.**

Messrs. Ransomes (14–16, Grosvenor-gardens, S.W.) exhibit a street concrete mixer, with long distributing boom, self-discharging bucket, and self-propelling road wheels. The "Urban" size combined dryer and mixer, for the production of tar macadam, asphalt, &c., is also shown. This plant has only one drying drum and one mixing axle. Messrs. Ransome also show a hoist bucket with set of head wheels, a hand mixer for concrete, tar macadam or chemicals, a turn-over cart, samples of steel piling and a pile helmet. The Ransome turn-over cart has a capacity of 6 cub. ft.

**The Rawlplug Co., Ltd.**
**Stand 53, Row D.**

The Rawlplug Co., Ltd. (1, Lenthall-place, South Kensington, S.W.7), show their patent fibre plug, which obviates the difficulties previously encountered in securing a firm fixture into any material. The exhibit includes examples of different materials in which the plug can be used to advantage. There are shown numerous fixtures on concrete, cement, brick, tiles, plaster and metal, &c. Different wiring systems are also shown fixed with Rawlplugs on plaster, switchboard fittings on polished slate, electric light fittings on glass, marble, plaster, &c. An expert is in attendance to give advice of the adaptability of Rawlplugs in any material, while continuous demonstrations are given showing how Rawlplugs can be manipulated.

**The Building Products Co.**
**Stand 77a, Row E.**

The Building Products, Ltd. (specialists in auxiliaries for concrete structures, Columbia House, 44–46, Kings-road, Sloane-square, S.W.3) show (1) their "Rigifix" bolt hanger sockets and slotted inserts. The exhibit consists of samples of the various standard fittings, both loose and mounted together with some reinforced concrete beams, showing the fittings embodied and their application. (2) The "Benquic" bar bender, erected on a bending bench. Demonstrations are given of the use of the machine in bending various reinforcement rods at various angles as required in practice. (3) Bareau,' the new cement waterproofing powder. (4) "Prufit," the cement waterproofing paste. (5) "Ferrolithic," the new metallic hardener and oilproofer. (6) "B.P. Concrete Form Cream," a preparation for applying to the moulds in concrete work to ensure easy withdrawal.

**Rippers, Ltd.**
**Stand 117, Row F.**

Messrs. Ripper, Ltd., joinery manufacturers, Castle Hedingham, Essex, show standard doors and windows, plain and enriched mantels, plain and enriched mouldings, special dressers and revolving cupboards, and other items of joinery. Samples of kiln-dried English oak and other timber are also exhibited.

**Willesden Paper & Canvas Works.**
**Stand 97, Row F.**

This firm is exhibiting on full-sized sections the application of Willesden paper under slates, on paper, and on close-boarded roofs as underlining, and on 4-ply paper as direct roofing with battens. They also have selections of their canvas specialities, flaxes and cottons; but the principal exhibit is the Willesden 2 and 1 ply paper for underlining and underslating, and 4 ply for direct roofing.

### The Ruberoid Co., Ltd.
### Stand 129, Row G.

The Ruberoid Co., Ltd. (81–3, Knightrider-street, E.C.), show "Ruberoid" roofing material for flat, pitched or curved boarded or concrete roofs. This material, which is made in two colours, red and green, is claimed to be proof against time, weather, water, acids and alkalies, and unaffected by heat or cold. Full sized models show the method of application to roofs of various types, and provide examples of flashings, gutters, &c. "Ruberoid" damp-course for foundations is purely bituminous, and is stated to be unaffected by pressure or temperature. There are also exhibited samples of flooring, sarking felt (for use under slates and tiles in exposed positions), which is a bituminous roofing designed specially for the covering of small buildings, such as poultry houses, cycle sheds, &c., insulating papers, and preservative paints.

### Sharp, Jones & Co.
### Stand 144, Row H.

This firm (Parkstone, Dorset) shows rock-concrete sewer tubes from 1 ft. to 6 ft. in diameter, together with bends, radials, level invert tapers, and junctions. A feature of the stand is a rock-concrete sewer manhole with the firm's patent "Aquatite" foundation piece, and one of these latter, of the type to be used on the Great West-road by the Middlesex County Council, is also shown, as well as a section of a horizontal septic tank 5 ft. in diameter, and the cover of a vertical one having manhole lid and suction pipe hole. A roof covered with interlocking concrete tiles, and a pair of concrete block sleepers for railways complete the exhibit.

### Siegwart Fireproof Floor Co., Ltd.
### Stand 1, Row A.

The Siegwart Fireproof Floor Co., Ltd., Tanet House, 231, Strand, London, W.C.2, are showing a small 7½ in. Siegwart floor and a Siegwart roof, 5 in. deep, supported on rolled steel joists. The exhibit is intended to show the advantage of the firm's system in eliminating centering.

### Mr. Sidney Smith.
### Stands 27, 28 and 29, Row B.

Mr. Sidney Smith, Lower Grove, Wandsworth, is showing the "Whirlpool" mixer, for hand or power.

### Smith Bros.
### Stand 7, Row B.

Messrs. Smith Bros. (of 5, Black Lion Hill, Northampton) are showing their patent ladder cripples for fixing to ladders to obtain a level platform for planks.

### Smith & Wellstood, Ltd.
### Stand 207, Row L.

Messrs. Smith & Wellstood, Ltd., of 11, Ludgate Circus, E.C.4, are showing samples of the "Wellstood" range, and some samples of the "Sovereign" range, a cheaper form. They have also a varied assortment of portable ranges for all kinds of hard fuel. The "Improved Ideal," with its revolving fire-bars, is a novelty; it is for use with anthracite. "Esse" anthracite stoves in all kinds of finishes, and a eight-gallon "Cowbrand" portable boiler for domestic purposes, are also shown.

### G. R. Speaker & Co.
### Stand 132, Row G.

The exhibit of Messrs. Speaker & Co. (Mark-lane and Mincing-lane, London, E.C.) shows the new patent "Trellit" construction in various stages of completion, the features of the system being a light steel framework made up of channel sections bent from 16 gauge mild steel and formed into units of 8 ft. by 8 ft., with horizontal bearers made of similar 2 in. channel sections, which are filled with wood battens to which "Externit" asbestos cement sheets are nailed, and the joints covered with wood overlays. The wall and ceiling frames are made collapsible for easy transport and re-erection on the site. The roof trusses consist of 3 in. steel channels all welded through-out, spaced at 8 ft. centres with purlins of the same section spaced at 4 ft. centres. The purlins are similarly filled with wood battens, to which 1 in. wood boarding is attached, and "Externit" asbestos cement tiles fixed in the ordinary way. Both walls and roof are braced throughout, all units being automatically squared when the braces are inserted. The system may be adapted to architects' requirements, and a selection of a number of types of buildings can be seen.

### Stothert & Pitt, Ltd.
### Stand 41, Row C.

The chief exhibit of Messrs. Stothert & Pitt, Ltd., of Bristol and London, consists of a No. 1 Victoria concrete mixer mounted on self-propelling truck and fitted up as a road paving plant. The mixing drum is built on standard lines, but is mounted in such a way that it discharges endwise instead of at the side of the truck. This arrangement is made to enable the plant to be travelled backwards as the work proceeds, without interrupting the laying of the concrete on the road. The special feature is the distributing boom along which a drop bottom skip is travelled. The movement is controlled by clutch gear, and can be reversed at will. The exhibit also includes a No. 0 Victoria mixer fitted with automatic water tank and batch charging hopper. The Smith hand mixer is included, an interesting feature of which is the internal arrangement of the drum which is such that the materials are constantly passed backwards and forwards through a restricted opening, and also the "Dri-crete" concrete blockmaking machine.

### Sturtevant Engineering Co., Ltd.
### Stand 83A, Row E.

The Sturtevant Engineering Co., Ltd. (147, Queen Victoria-street, E.C.4) show turbine vacuum cleaning plants in a number of sizes. The machines shown are as follows:—8-h.p. type "B" turbo exhauster, with dust separator; 3–4 h.p. portable workshop type cleaner; ½-h.p. portable turbine electric suction cleaner; and ventilating fans.

### The Sussex Brick & Estates Co., Ltd.
### Stand 179, Row J.

The Sussex Brick & Estates Co., Ltd. (Horsham), exhibit a brick pavilion, designed by Mr. W. H. Hope, with the object of showing from an engineering point of view the weight carrying, alignment, correctness to size, form and shape, of their Southwater engineering bricks.

### Sutcliffe, Speakman & Co., Ltd.
### Stand 156, Row H.

Messrs. Sutcliffe, Speakman & Co., Ltd. (Leigh, Lancs.), are exhibiting a brick press in operation. This press was specially designed and constructed for the manufacture of bricks from sand, blast-furnace slag, destructor clinker, boiler ashes and similar waste. Samples of the various classes of bricks produced are exhibited, one of them, a slag brick, being so light as to float on water, and yet of such texture as to allow of a 5 in. nail being driven into it without harm. There is also exhibited a pottery moulding machine.

### John Tann, Ltd.
### Stand 43, Row C.

John Tann, Ltd., have a special exhibit of high-grade strong-room doors, showing the firm's patent anti-explosive and anti-blowpipe devices, by means of which it is made impossible for access to be gained to a strong-room or safe so fitted, even if all the locks with which it is provided are entirely destroyed by high explosives, by the oxy-acetylene blowpipe, or by similar means. The firm is also exhibiting plate closet and party wall doors, fire-resisting doors for book rooms, strong-room grilles, ventilators, shelving, and other steel fittings; also fire and burglar-resisting safes of all kinds, cash and deed boxes, locks, &c. The exhibit of safes also includes a safe specially constructed for the security of jewellery in private houses, fitted with velvet lined mahogany drawers and trays, and completely enclosed in a mahogany cabinet.

### Tuke & Bell, Ltd.
### Stand 60, Row D (Ground Floor), and Stand 2, Row B (Gallery).

Messrs. Tuke & Bell, Ltd., of Lichfield, Staffs., and Lincoln's Inn Fields, W.C.2, show their system of sewage purification for country houses and isolated buildings, which comprises a patent semi-septic tank and aerobic filter, with the automatic distributing apparatus, which includes serrated edged troughs from which the tank liquor is discharged to the filter, over. There is a final humus pit to arrest the mineralised matter. In the Gallery this firm shows sewage distributors for village and town installations, as well as a sewage ejector and sewerage ironwork, including the patent "Grip" manhole cover. They also have on view a 3-ton "Constable" patent either-side tipping wagon, the tipping of which takes place by gravity.

### Vickers, Ltd.
### Stand 71 and 72, Row D.

Messrs. Vickers, Ltd. (Building Department), Westminster, are showing a portable concrete brick machine for hand power, making six bricks at a time, of the standard British or Continental dimensions, either plain or coloured. By adjustments, any thickness or type of brick may be made without any additional apparatus. The firm's concrete partition slab machine, for making slabs of varying thicknesses, and hollow or solid slabs for partitions or external walls, is also shown, as is the "Hobbs" block machine for producing blocks, hollow or solid, on the face down system. The concrete interlocking roofing tile machine is a portable plant for producing interlocking roofing tiles of any desired colour or surface. The doors, windows, gates, dressers, &c., shown on the stand are examples of standardised joinery. Messrs. Petters, Ltd., & Vickers-Petters, Ltd., are showing an electric lighting set, which starts on a small quantity of petrol, changing over automatically to paraffin. Messrs. W. T. Glover & Co. are showing samples of their patent glazing system. The steel bars used are passed through a bath of preservative compound and sheathed with pure virgin lead applied direct to the bars by hydraulic pressure. The Metropolitan-Vickers Electrical Co. show an electric bulb fire, electric iron, electric cooler, and other electrical heating and cooking apparatus and labour-saving devices.

### Vulcanite, Ltd.
### Stand 89, Row E.

Messrs. Vulcanite, Ltd., 118, Cannon-street, E.C.1, are exhibiting models showing the application of "Vulcanite" roofing and asphalte cavity walls. There are also shown other roofing material, roofing felts, sheet asphalte for roofing and dampcourses, lead and bitumen dampcourses, bitumen and water-proof sheetings for sarking, etc.

### The Waller Housing Corporation Ltd.
### Stands 114 & 115, Row F.

The Waller Housing Corporation, Ltd., 16, Albemarle-street, London, W.1, shew a small building constructed on the Waller system, and also various samples of the parts from which they are constructing houses.

### R. G. Ward & Co., Ltd.
### Stand 166, Row J.

This firm (5, Lawrence Pountney-hill, E.C.4) is concentrating exclusively on the "Thistle" plaster board. This is an improved lathing material, claimed to be sound-deadening and fire-resisting, speedy in construction and saves labour and material in plastering.

### The Well Fire & Foundry Co., Ltd.
### Stand 209, Row L.

The exhibit of the Well Fire & Foundry Co., Ltd. (15, Berners-street, W.) consists of a pavilion of classic design in which selected complete mantelpiece suites offer a few suggestions as to how the patent well fire can be adapted to all types of interior decoration.

(*Continued on p.* lxvii.)

# THE BUILDING TRADE.

## THE DESIGN AND REINFORCEMENT OF CANTILEVERS.

The author has several times used reinforced concrete construction of balconies or cantilevers, and he recommends its use for this form of construction. The engineer is frequently called upon to design cantilevers for power houses, and the architect to design balconies for public and other buildings.

The method of designing these is very simple, and a typical example is all that is necessary.

*Example.*—Design a balcony suitable for a public school; this is to project 7 ft. from its support, and is to carry a load of 1,000 lbs. per foot run.

Allowing 100 lbs. per foot for the weight of the cantilever, and 1,000 lbs. per foot run for the load it has to carry, the total load will be $1,100 \times 7 = 7,700$ lbs.

$$M = \frac{WL}{2} = \frac{7,700 \times 7 \times 12}{2} = 323,400 \text{ inch.-lbs.}$$

The depth "$d$" will equal:—

$$d = \sqrt[3]{\frac{M}{95 \times 0.5}} = \sqrt[3]{\frac{323,400}{95 \times 0.5}}$$

Say 21½ in. to centre of reinforcement, and 24 in. total depth: $\sqrt[3]{6,801} = 21.17$ inches.

$b = 0.5d = 12$ inches.

$a = p\,b\,d = 0.00675 \times 12 \times 24 = 1.94$ inches

Three ¾-inch square bars to the running foot will be sufficient. The BM will diminish towards the outer end.

At the centre of the length the BM will equal:

$$\frac{w\,l^2}{2}$$

$$= \frac{1,000 \times 3.5^2 \times 12}{2} = 73,500 \text{ inch lbs.}$$

With the breadth 12 in. as before, the depth at the centre will equal:—

$$\sqrt{\frac{M}{95b}} = \sqrt{\frac{73,500}{95 \times 12}} = 8.2 \text{ inches.}$$

and allowing for 2 in. covering of the say, 8.5 inches, reinforcement = 10.5, which is about half the depth at the support.

The reinforcement at the centre will equal $p\,b\,d = 0.00675 \times 12 \times 10.5 = 0.85$ inch.

The cantilever at its outer end should not be less in depth than 4 in (6 in. is preferable), seeing that it has to support cast-iron standards, and the bases of these are tied into the concrete. The reinforcement should have a 2-in. cover; a "plastic" mixture should be used, and the aggregate should be graded, and not exceed a size which will pass through a 1-inch ring.

The reinforcement at the centre will consist of three ¾-inch square bars to every 2-ft. length of the cantilever. The bars should run transversely, and should be well anchored to the supports. Although not really necessary, it is the custom to put in a few light rods running (longitudinally) on the upper side of the slab to stiffen the structure, say, ½-inch rods 1 ft. apart, and to add shear members as shown in the section. E. R. M.

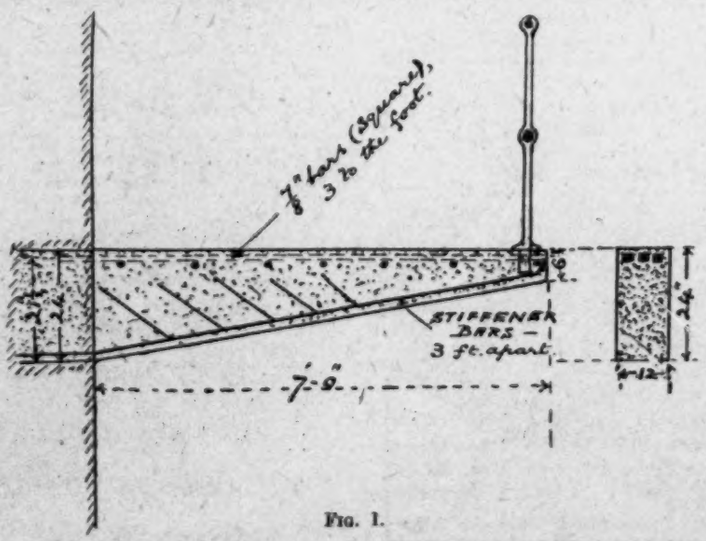



Fig. 1.

## THE SURFACE OF SCHOOL PLAYGROUNDS.

[Communicated.]

One of the education authorities has for some time had under consideration the question of school playground surfaces and the best and most economical method of dealing with them. Inquiries were made of other authorities, with a view of elucidating this question, and interesting replies were received from several, who shall be referred to as "A" to "Q"—seventeen in all. It will be seen how diversified is the mature opinion of experts on this particular question.

### Asphalt.

First, as regards the use of asphalt, which seemed to possess many obvious advantages in ease of application and comparatively small first cost:—

"A" for some time used asphalt; but their experience was varied, and they ultimately decided to use concrete flags instead of asphalt.

"B."—Some of their playgrounds coated with asphalt have given no trouble during the last ten years, and there seems no reason why it should not last from twelve to fifteen years; but, on the other hand, some have given trouble and developed serious defects in a year or two from the time when laid.

"C" has used no other material than asphalt for playgrounds, and found that, if new asphalt work was allowed to stand for twelve months

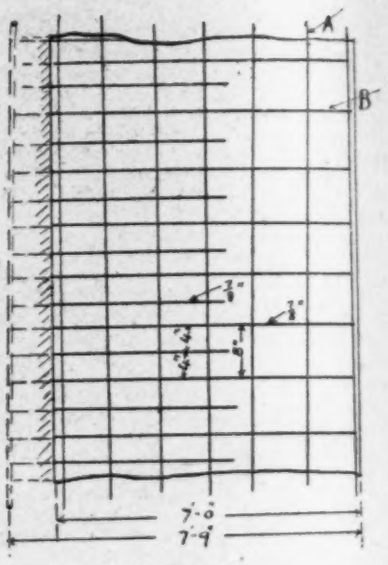



Fig. 2.

A. ½" bars (round, longitudinal).
B. ¾" bars (square, transverse).

and then sprayed and gritted, its life was prolonged considerably.

"D" prefer asphalt to granolithic, but think it should be re-coated immediately signs of wear appear.

"E" affirms that asphalt has given better results than any other material.

Against this, "F" have found that their asphalted playgrounds have proved very unsatisfactory; "G" have found that ordinary tarred asphalt is more satisfactory than concrete; "H" say that they have been recommended not to use asphalt at all for playgrounds; "I" have found asphalt to be unsatisfactory as a material for playgrounds; and "J" had the same experience.

"K," on the other hand, say that all their school playgrounds, with one exception, are asphalted, and all are in good condition. Careful attention has been given in all cases immediately there are any signs of crumbling of the surface, and the asphalt is tar-sprayed all over and fine limestone chippings are thrown on top. This is claimed to refresh the surface and to result in much more wear being got out of the asphalt covering.

"L" have all their playgrounds covered with tar paving or limestone asphalt; many of these have been laid from fifteen to twenty-five years, and are still giving every satisfaction.

"M" use nothing else but limestone tar paving, and have found that, if after, say, eight or ten years' wear, the surface is getting loose, it is sprayed with tar and covered with fine grit, a further eight or ten years' life is gained from the covering.

"N" have found that, with a foundation of good clinker or sand, then 4 in. of 2 in. tarred metal, and above that 1 in. of ½ in. tarred metal, the surface being thoroughly rolled and dusted with suitable coarse grit, a most suitable method has been experienced. When there are signs of wear, say, in a couple of years' time, the surface is thoroughly cleaned with a hard broom and then tarred and covered with sand or coarse grit.

"O" have found that tar paving of school playgrounds is not of much value.

"Q" asphalted their playground seven years ago; but, owing to ground settlements, this

(Continued on p. 439.)

has been considerably worn. This authority is about to lay down tar paving 2 in. thick.

### Granolithic Paving.

Of course, other classes of materials were suggested for use as surfacing of school playgrounds. Granolithic concrete laid without joints in situ has been used by "A." They had little experience of it, but considered the surface quite satisfactory if carefully done.

"B" considered that the cost would be prohibitive, and had no experience of the material.

"D" had used the granolithic for one playground only, and did not consider it quite satisfactory, as it wears smooth and cracks and so becomes dangerous.

"E" found that the material did not give such good results as asphalt.

"F," on the other hand, had found granolithic slabs quite satisfactory, and there had been no serious accidents to scholars.

"I" had used the material and found it very satisfactory, and there had been no accidents; the objection to such slabs was that any settlement of the ground after the slabs were laid caused a general unevenness of the playground surface, with great risk of accidents to the children. This authority recommended that, if granolithic slabs were used, the ground should be laid to falls, then a 4½ in. Portland cement concrete bottom should be laid, the top being finished with 1½ in. Portland cement concrete mixed in 1:4 proportions of cement and crushed granite. The surface should be brush finished, and the whole laid in 6 ft. squares.

"J" had used the material invariably, and it had proved very effective.

"K" had laid one school playground with this material and found it very expensive. When the slabs sink the children are apt to catch their toes on the edges of the adjoining slabs.

"M" thought the material would be liable to wear smooth and become dangerous.

### Various.

"A" decided that concrete flags would be more economical than asphalt. Such flags can be raised if they sink, or they can be taken up and replaced much more easily than granolithic slabs laid in 6 ft. squares.

"H" have tried concrete flags and found them both durable and non-slippery.

"B" prefer Staffordshire blue bricks laid on ashes, and say this paving is very durable and is easily relaid if the ground is in any way disturbed.

"F" have used a mixture of cement, granite chippings and crushed brick. After five years, this surface is quite clean and non-slippery.

"O" recommend a good vitrified buff paving brick as being quite satisfactory. They have several playgrounds so surfaced, which, after being in use fourteen years, are in as good condition as when they were new, and there has been no complaint or accident.

"P" has found that limestone chippings form a good surface, which has been found quite satisfactory.

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### Joint Roads Committee.

It is officially announced that all work hitherto performed by the Joint Roads Committee relating to public highways has been transferred, as from March 31, to the Ministry of Transport (Roads Department), 7, Whitehall-gardens, S.W. 1, with the exception of the settlement of claims in respect of third party timber traffic. These claims will continue to be dealt with by the Joint Roads Committee as heretofore.

### Protection for Business Premises.

In reply to a question in the House of Commons last week, Dr. Addison (Minister of Health) said the Committee which was appointed to consider the operation of the Rent Restriction Acts, was considering the possibility of giving tenants of business premises the right of appeal to a judge of the High Court. The report of the Committee would be published shortly.

## RATES OF WAGES IN THE BUILDING TRADE.

**The following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur:—**

| | Masons. | Bricklayers. | Carpenters, Joiners. | Plasterers. | Slaters. | Plumbers. | Painters | Masons' Labourers. | Bricklayers' Labourers | Plasterers' Labourers. |
|---|---|---|---|---|---|---|---|---|---|---|
| Aberdare | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Accrington | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Altrincham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Ashton-under-Lyne | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Barnsley | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Barrow-in-Furness | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Barry | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Bath | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 | 1/6 |
| Bedford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Birkenhead | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 1/4½ | 1/4½ | 1/4½ |
| Birmingham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Bishop Auckland | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | | 1/5½-1/6½ | |
| Blackburn | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/6½-1/6½ | |
| Blackpool | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/7½-1/7½ | |
| Bolton | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Bournemouth | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/2½ | 1/2½ | 1/2½ |
| Bradford | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Bridgwater | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/2½ | 1/2½ | 1/2½ |
| Brighton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Bristol | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½½ | 1/6½½ | 1/8½½ |
| Burnley | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | | 1/5½½-1/6½ | |
| Burton-on-Trent | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Bury | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½½ | |
| Cambridge | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/6½½ | 1/4½½ | 1/4½½ | 1/4½½ |
| Cardiff | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Chatham | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Chelmsford | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/3½ | 1/1½ | 1/1½ | 1/1½ |
| Cheltenham | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Chester | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | | 1/5½½-1/6½ | |
| Chesterfield | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Colchester | 1/6½½ | 1/6½½ | 1/6½½ | 1/6½½ | 1/6½½ | 1/6½½ | 1/5½½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Coventry | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Crewe | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | | 1/3½-1/3½½ | |
| Darlington | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Derby | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Doncaster | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Dudley | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Durham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ ‖ |
| East Glam. and Mon. Valleys | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Exeter | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/4½ | 1/3½ | 1/3½ | 1/3½ |
| Folkestone | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Gloucester | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Grantham | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Grays | 1/11½½ | 1/11½½ | 1/11½½ | 1/11½½ | 1/11½½ | 2/-½ | 1/10½½ | 1/8½ | 1/8½ | 1/8½ |
| Grimsby | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½½ | 1/8½½ | 1/8½½ |
| Great Yarmouth | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/6½½ | 1/4½½ | 1/4½½ | 1/4½½ |
| Guildford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/7½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Halifax | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Harrogate | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Hartlepools | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Hastings | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Hereford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Huddersfield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Hull | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Ipswich | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/6½½ | 1/4½½ | 1/4½½ | 1/4½½ |
| Lancaster | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | | 1/5½-1/6½ | |
| Leamington Spa | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Leeds | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Leicester | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Lincoln | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Liverpool | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 1/6½ | 1/6½ | 1/6½ |
| Llanelly | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 2/0½ | 1/10½½ | 1/8½ | 1/8½ | 1/8½ |
| London | 1/11½½ | 1/11½½ | 1/11½½ | 1/11½½ | — | — | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Loughborough | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/7½ | 1/5½ | 1/5½ | 1/5½ |
| Luton | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/7½ | 1/3½ | 1/3½ | 1/3½ |
| Maidstone | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | | 1/7½-1/7½ | |
| Manchester | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Mansfield | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Merthyr Tydfil | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Middlesbrough | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Newcastle-on-Tyne | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Newport, Mon. | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Northampton | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Norwich | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/7½½ | 1/6½½ | 1/4½½ | 1/4½½ | 1/4½½ |
| Nottingham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Oldham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Oxford | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/4½ | 1/2½ | 1/2½ | 1/2½ |
| Plymouth | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Pontypridd | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Portsmouth | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Preston | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | | 1/5½-1/6½ | |
| Reading | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Rochdale | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Rochester | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Rugby | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/7½ |
| St. Albans | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/3½½ | 1/3½½ | 1/3½½ |
| St. Helen's | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Scarborough | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Sheffield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 2/-½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ |
| Shrewsbury | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Southampton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Southend-on-Sea | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/5½½ | 1/5½½ | 1/5½½ |
| Southport | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | | 1/5½-1/6½ | |
| South Shields | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Stockport | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| stockton-on-Tees | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Stoke-on-Trent | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/6½ | 1/8½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Stroud | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Sunderland | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Swansea | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Taunton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Torquay | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/3½½ | 1/3½½ | 1/3½½ |
| Wakefield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Walsall | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Warrington | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| West Bromwich | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Wigan | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Windsor | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Wolverhampton | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/8½½ | 1/6½½ | 1/6½½ | 1/6½½ |
| Worcester | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| York | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/9½½ | 1/6½½ | 1/6½½ | 1/6½½ |

The Masons' rate given is for bankers: fixers usually 6d. per hour extra. * War bonus of 2s. per week granted. † War bonus of 3s. per week granted. ‡ War bonus of 3s. 6d. per week granted. ‡‡ War bonus of 4s. per week granted. ¶ War bonus of 7s. 6d. per week granted. ‖ These rates include the 12½ per cent. bonus. [The above rates, unless otherwise shown, are exclusive of 12½ per cent. bonus.—Ed.]

# THE BUILDING TRADE.

## THE DESIGN AND REINFORCEMENT OF CANTILEVERS.

The author has several times used reinforced concrete construction of balconies or cantilevers, and he recommends its use for this form of construction. The engineer is frequently called upon to design cantilevers for power houses, and the architect to design balconies for public and other buildings.

The method of designing these is very simple, and a typical example is all that is necessary.

*Example.*—Design a balcony suitable for a public school; this is to project 7 ft. from its support, and is to carry a load of 1,000 lbs. per foot run.

Allowing 100 lbs. per foot for the weight of the cantilever, and 1,000 lbs. per foot run for the load it has to carry, the total load will be $1,100 \times 7 = 7,700$ lbs.

$$M = \frac{WL}{2} = \frac{7,700 \times 7 \times 12}{2} = 323,400 \text{ inch.-lbs.}$$

The depth "$d$" will equal:—

$$d = \sqrt[3]{\frac{M}{95 \times 0.5}} = \sqrt[3]{\frac{323,400}{95 \times 0.5}}$$

Say 21½ in. to centre of reinforcement, and 24 in. total depth:

$\sqrt[3]{6,801} = 21.17$ inches.

$b = 0.5d = 12$ inches.

$a = p\,b\,d = 0.00675 \times 12 \times 24$ 1.94 inches

Three ¾-inch square bars to the running foot will be sufficient. The BM will diminish towards the outer end.

At the centre of the length the BM will equal:

$$\frac{\frac{w\,l^2}{2}}{2} = \frac{1,000 \times 3.5^2 \times 12}{2} = 73,500 \text{ inch lbs.}$$

With the breadth 12 in. as before, the depth at the centre will equal:—

$$\sqrt{\frac{M}{955}} = \sqrt{\frac{73,500}{95 \times 12}} = 8.2 \text{ inches.}$$

and allowing for 2 in. covering of the say, 8.5 inches, reinforcement = 10.5, which is about half the depth at the support.

The reinforcement at the centre will equal $p\,b\,d = 0.00675 \times 12 \times 10.5 = 0.85$ inch.

The cantilever at its outer end should not be less in depth than 4 in (6 in. is preferable), seeing that it has to support cast-iron standards, and the bases of these are tied into the concrete. The reinforcement should have a 2-in. cover; a "plastic" mixture should be used, and the aggregate should be graded, and not exceed a size which will pass

The reinforcemen
of three ¾-inch squa
of the cantilever.
versely, and should
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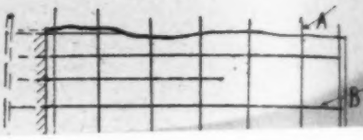
the custom to put i
(longitudinally) on t
stiffen the structur
apart, and to add
in the section. E.



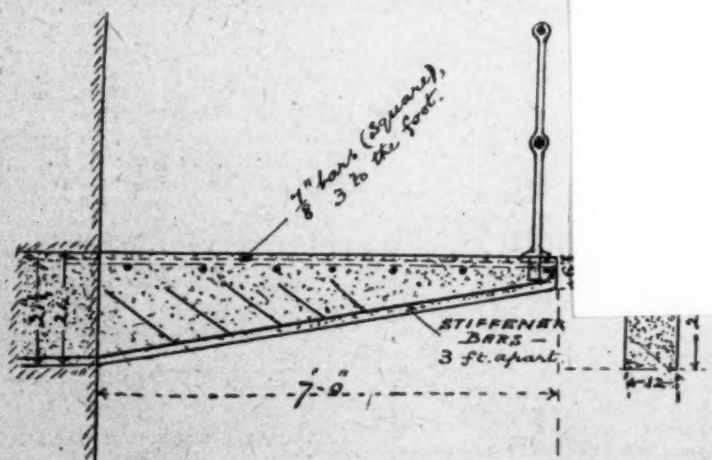




Fig. 1.

## THE SURFA
## PLAYG

[Comm

One of the educati
time had under con
school playground s
most economical met
Inquiries were made
a view of elucidating
ing replies were rec
shall be referred to
seventeen in all. It w
is the mature opinio
cular question.

A

First, as regards t
seemed to possess n
in case of application
first cost:—

"A" for some tim
experience was varie
decided to use concret

"B."—Some of t
with asphalt have giv
last ten years, and th
it should not last fron
but, on the other h
trouble and developed
or two from the time

"C" has used no ot
for playgrounds, and f
work was allowed to

metal, the surface being thoroughly rolled and dusted with suitable coarse grit, a most suitable method has been experienced. When there are signs of wear, say, in a couple of years' time, the surface is thoroughly cleaned with a hard broom and then tarred and covered with sand or coarse grit.

"O" have found that tar paving of school playgrounds is not of much value.

"Q" asphalted their playground seven years ago; but, owing to ground settlements, this

(Continued on p. 439.)

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Pages
Best Possib
Obtained

has been considerably worn. This authority is about to lay down tar paving 2 in. thick.

### Granolithic Paving.

Of course, other classes of materials were suggested for use as surfacing of school playgrounds. Granolithic concrete laid without joints in situ has been used by "A." They had little experience of it, but considered the surface quite satisfactory if carefully done.

"B" considered that the cost would be prohibitive, and had no experience of the material.

"D" had used the granolithic for one playground only, and did not consider it quite

[illegible] Committee as heretofore.

### Protection for Business Premises.

In reply to a question in the House of Commons last week, Dr. Addison (Minister of Health) said the Committee which was appointed to consider the operation of the Rent Restriction Acts, was considering the possibility of giving tenants of business premises the right of appeal to a judge of the High Court. The report of the Committee would be published shortly.

## RATES OF WAGES IN THE BUILDING TRADE.

The following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur :—

| | Masons. | Bricklayers. | Carpenters, Joiners. | Plasterers. | Slaters. | Plumbers. | Painters | Masons' Labourers. | Bricklayers' Labourers | Plasterers' Labourers. |
|---|---|---|---|---|---|---|---|---|---|---|
| | per hour | | | | | | | | | |
| Aberdare | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Accrington | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/11½ | 1/9½ | 1/11½ | | 1/5½–1/6½ | |
| Altrincham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| Ashton-under-Lyne | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| Barnsley | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Barrow-in-Furness | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| Barry | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Bath | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/5½ | 1/5½ |
| Bedford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 2/–† | 2/–§ | 2/–‡ | 2/–† | 2/–§ | 2/–† | 1/11½ | 1/9½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/5½–1/6½ | |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½–1/6½ | |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/7½–1/7½ | |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/2½ | 1/2½ | 1/2½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/2½ | 1/2½ | 1/2½ |
| | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 1/9½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | — | 2/0½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/8½ | 1/7½ | 1/5½ | 1/5½ | 1/5½ |
| | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 2/–§ | 1/9½ | 1/8½ | 1/8½ |
| | 2/–§ | 2/–§ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/11½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | | 1/7½–1/7½ | |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | | 1/7½–1/7½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | | 1/7½–1/7½ | |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | | 1/7½–1/7½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/8½ | 1/8½ |
| Swansea | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Taunton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| Torquay | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Wakefield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | 1/8½ | 1/8½ |
| Walsall | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Warrington | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½–1/7½ | |
| West Bromwich | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/8½ | | 1/7½–1/7½ |
| Wigan | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Windsor | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Wolverhampton | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Worcester | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| York | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |

The Masons' rate given is for bankers: fixers usually 1d. per hour extra. * War bonus of 8s. per week granted. †† War bonus of 7s. per week granted. † War bonus of 3s. per week granted. ‡ War bonus of 3s. 6d. per week granted. ‡‡ War bonus of 4s. per week granted. ¶ War bonus of 7s. 6d. per week granted. § These rates include the 12½ per cent. bonus. [The above rates, unless otherwise shown, are exclusive of 12½ per cent. bonus.—Ed.]

# THE BUILDING TRADE.

## THE DESIGN AND REINFORCEMENT OF CANTILEVERS.

The author has several times used reinforced concrete construction of balconies or cantilevers, and he recommends its use for this form of construction. The engineer is frequently called upon to design cantilevers for power houses, and the architect to design balconies for public and other buildings.

The method of designing these is very simple, and a typical example is all that is necessary.

*Example.*—Design a balcony suitable for a public school; this is to project 7 ft. from its support, and is to carry a load of 1,000 lbs. per foot run.

Allowing 100 lbs. per foot for the weight of the cantilever, and 1,000 lbs. per foot run for the load it has to carry, the total load will be $1,100 \times 7 = 7,700$ lbs.

$$M = \frac{WL}{2} = \frac{7,700 \times 7 \times 12}{2} = 323,400 \text{ inch.-lbs.}$$

The depth "$d$" will equal:—

$$d = \sqrt[3]{\frac{M}{95 \times 0.5}} = \sqrt[3]{\frac{323,400}{95 \times 0.5}}$$

Say 21½ in. to centre of reinforcement, and 24 in. total depth: $\sqrt[3]{6,801} = 21.17$ inches.

$b = 0.5d = 12$ inches.

$a = p\,b\,d = 0.00675 \times 12 \times 24 = 1.94$ inches

Three ¾-inch square bars to the running foot will be sufficient. The BM will diminish towards the outer end.

At the centre of the length the BM will equal:

$$\frac{wl^2}{2}$$

$$= \frac{1,000 \times 3.5^2 \times 12}{2} = 73,500 \text{ inch lbs.}$$

With the breadth 12 in. as before, the depth at the centre will equal:—

$$\sqrt{\frac{M}{95b}} = \sqrt{\frac{73,500}{95 \times 12}} = 8.2 \text{ inches.}$$

and allowing for 2 in. covering of the say, 8.5 inches, reinforcement = 10.5, which is about half the depth at the support.

The reinforcement at the centre will equal $p\,b\,d = 0.00675 \times 12 \times 10.5 = 0.85$ inch.

The cantilever at its outer end should not be less in depth than 4 in (6 in. is preferable), seeing that it has to support cast-iron standards, and the bases of these are tied into the concrete. The reinforcement should have a 2-in. cover; a "plastic" mixture should be used, and the aggregate should be graded, and not exceed a size which will pass through a 1-inch ring.

The reinforcement at the centre will consist of three ¾-inch square bars to every 2-ft. length of the cantilever. The bars should run transversely, and should be well anchored to the supports. Although not really necessary, it is the custom to put in a few light rods running (longitudinally) on the upper side of the slab to stiffen the structure, say, ½-inch rods 1 ft. apart, and to add shear members as shown in the section. E. R. M.

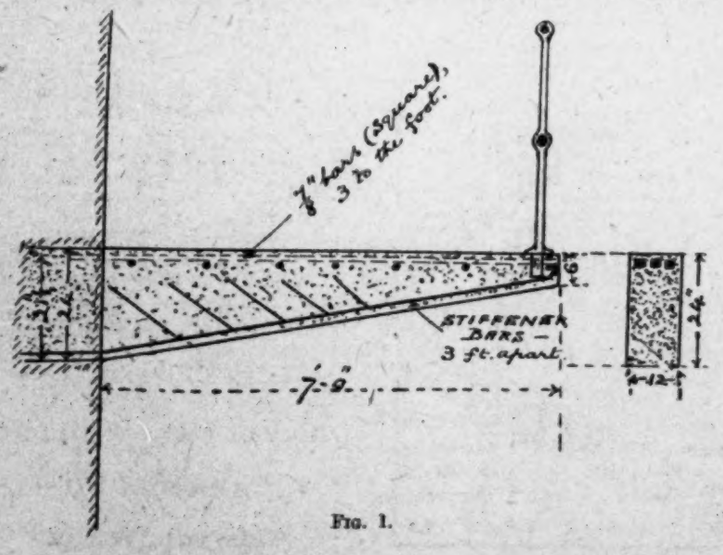


Fig. 1.

## THE SURFACE OF SCHOOL PLAYGROUNDS.

[Communicated.]

One of the education authorities has for some time had under consideration the question of school playground surfaces and the best and most economical method of dealing with them. Inquiries were made of other authorities, with a view of elucidating this question, and interesting replies were received from several, who shall be referred to as "A" to "Q"—seventeen in all. It will be seen how diversified is the mature opinion of experts on this particular question.

### Asphalt.

First, as regards the use of asphalt, which seemed to possess many obvious advantages in ease of application and comparatively small first cost:—

"A" for some time used asphalt; but their experience was varied, and they ultimately decided to use concrete flags instead of asphalt.

"B."—Some of their playgrounds coated with asphalt have given no trouble during the last ten years, and there seems no reason why it should not last from twelve to fifteen years; but, on the other hand, some have given trouble and developed serious defects in a year or two from the time when laid.

"C" has used no other material than asphalt for playgrounds, and found that, if new asphalt work was allowed to stand for twelve months

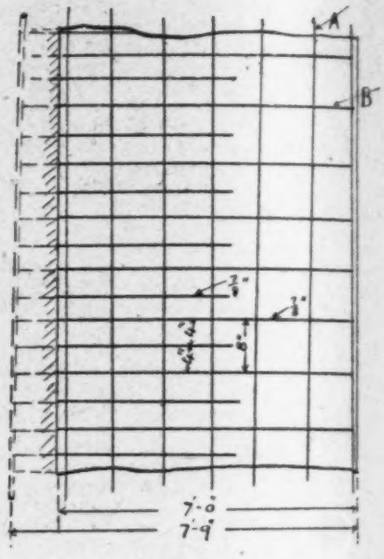


Fig. 2.

A. ½" bars (round, longitudinal).
B. ¾" bars (square, transverse).

and then sprayed and gritted, its life was prolonged considerably.

"D" prefer asphalt to granolithic, but think it should be re-coated immediately signs of wear appear.

"E" affirms that asphalt has given better results than any other material.

Against this, "F" have found that their asphalted playgrounds have proved very unsatisfactory; "G" have found that ordinary tarred asphalt is more satisfactory than concrete; "H" say that they have been recommended not to use asphalt at all for playgrounds; "I" have found asphalt to be unsatisfactory as a material for playgrounds; and "J" had the same experience.

"K," on the other hand, say that all their school playgrounds, with one exception, are asphalted, and all are in good condition. Careful attention has been given in all cases immediately there are any signs of crumbling of the surface, and the asphalt is tar-sprayed all over and fine limestone chippings are thrown on top. This is claimed to refresh the surface and to result in much more wear being got out of the asphalt covering.

"L" have all their playgrounds covered with tar paving or limestone asphalt; many of these have been laid from fifteen to twenty-five years, and are still giving every satisfaction.

"M" use nothing else but limestone tar paving, and have found that, if after, say, eight or ten years' wear, the surface is getting loose, it is sprayed with tar and covered with fine grit, a further eight or ten years' life is gained from the covering.

"N" have found that, with a foundation of good clinker or sand, then 4 in. of 2 in. tarred metal, and above that 1 in. of ¾ in. tarred metal, the surface being thoroughly rolled and dusted with suitable coarse grit, a most suitable method has been experienced. When there are signs of wear, say, in a couple of years' time, the surface is thoroughly cleaned with a hard broom and then tarred and covered with sand or coarse grit.

"O" have found that tar paving of school playgrounds is not of much value.

"Q" asphalted their playground seven years ago; but, owing to ground settlements, this

(*Continued on p.* 439.)

has been considerably worn. This authority is about to lay down tar paving 2 in. thick.

### Granolithic Paving.

Of course, other classes of materials were suggested for use as surfacing of school playgrounds. Granolithic concrete laid without joints in situ has been used by "A." They had little experience of it, but considered the surface quite satisfactory if carefully done.

"B" considered that the cost would be prohibitive, and had no experience of the material.

"D" had used the granolithic for one playground only, and did not consider it quite satisfactory, as it wears smooth and cracks and so becomes dangerous.

"E" found that the material did not give such good results as asphalt.

"F," on the other hand, had found granolithic slabs quite satisfactory, and there had been no serious accidents to scholars.

"I" had used the material and found it very satisfactory, and there had been no accidents; the objection to such slabs was that any settlement of the ground after the slabs were laid caused a general unevenness of the playground surface, with great risk of accidents to the children. This authority recommended that, if granolithic slabs were used, the ground should be laid to falls, then a 4½ in. Portland cement concrete bottom should be laid, the top being finished with 1½ in. Portland cement concrete mixed in 1: 4 proportions of cement and crushed granite. The surface should be brush finished, and the whole laid in 6 ft. squares.

"J" had used the material invariably, and it had proved very effective.

"K" had laid one school playground with this material and found it very expensive. When the slabs sink the children are apt to catch their toes on the edges of the adjoining slabs.

"M" thought the material would be liable to wear smooth and become dangerous.

### Various.

"A" decided that concrete flags would be more economical than asphalt. Such flags can be raised if they sink, or they can be taken up and replaced much more easily than granolithic slabs laid in 6 ft. squares.

"H" have tried concrete flags and found them both durable and non-slippery.

"B" prefer Staffordshire blue bricks laid on ashes, and say this paving is very durable and is easily relaid if the ground is in any way disturbed.

"F" have used a mixture of cement, granite chippings and crushed brick. After five years, this surface is quite clean and non-slippery.

"O" recommend a good vitrified buff paving brick as being quite satisfactory. They have several playgrounds so surfaced, which, after being in use fourteen years, are in as good condition as when they were new, and there has been no complaint or accident.

"P" has found that limestone chippings form a good surface, which has been found quite satisfactory.

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### Joint Roads Committee.

It is officially announced that all work hitherto performed by the Joint Roads Committee relating to public highways has been transferred, as from March 31, to the Ministry of Transport (Roads Department), 7, Whitehall-gardens, S.W. 1, with the exception of the settlement of claims in respect of third party timber traffic. These claims will continue to be dealt with by the Joint Roads Committee as heretofore.

### Protection for Business Premises.

In reply to a question in the House of Commons last week, Dr. Addison (Minister of Health) said the Committee which was appointed to consider the operation of the Rent Restriction Acts, was considering the possibility of giving tenants of business premises the right of appeal to a judge of the High Court. The report of the Committee would be published shortly.

## RATES OF WAGES IN THE BUILDING TRADE.

**The following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur:—**

| | Masons. | Bricklayers. | Carpenters, Joiners. | Plasterers. | Slaters. | Plumbers. | Painters | Masons' Labourers. | Bricklayers' Labourers | Plasterers' Labourers. |
|---|---|---|---|---|---|---|---|---|---|---|
| Aberdare | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Accrington | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Altrincham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Ashton-under-Lyne | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Barnsley | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Barrow-in-Furness | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Barry | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Bath | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Bedford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| Birkenhead | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 1/4½ | 1/4½ | 1/4½ |
| Birmingham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Bishop Auckland | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Blackburn | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Blackpool | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Bolton | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Bournemouth | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/2½ | 1/2½ | 1/2½ |
| Bradford | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Bridgwater | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/2½ | 1/2½ | 1/2½ |
| Brighton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Bristol | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/5½ | 1/5½ | 1/5½ |
| Burnley | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Burton-on-Trent | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Bury | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Cambridge | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Cardiff | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Chatham | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| Chelmsford | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/4½ | 1/3½ | 1/1½ | 1/1½ | 1/1½ |
| Cheltenham | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Chester | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Chesterfield | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/5½ | 1/6½ |
| Colchester | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Coventry | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Crewe | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | | 1/5½-1/6½ | |
| Darlington | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/5½ | 1/6½ |
| Derby | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Doncaster | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Dudley | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Durham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| East Glam. and Mon. Valleys | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Exeter | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/4½ | 1/3½ | 1/3½ | 1/3½ |
| Folkestone | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Gloucester | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Grantham | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Grays | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 2/-½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Grimsby | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Great Yarmouth | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Guildford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Halifax | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Harrogate | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Hartlepools | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Hastings | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Hereford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Huddersfield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Hull | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Ipswich | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Lancaster | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Leamington Spa | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Leeds | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Leicester | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Lincoln | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Liverpool | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 2/-½ | 1/9½ | 1/9½ | 1/9½ |
| Llanelly | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| London | 1/11½ | 1/11½ | 1/11½ | 1/11½ | — | 2/0½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Loughborough | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Luton | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/7½ | 1/5½ | 1/5½ | 1/5½ |
| Maidstone | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Manchester | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Mansfield | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Merthyr Tydfil | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Middlesbrough | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Newcastle-on-Tyne | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Newport, Mon. | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Northampton | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Norwich | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| Nottingham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Oldham | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Oxford | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/2½ | 1/2½ | 1/2½ |
| Plymouth | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/6½ | 1/6½ | 1/6½ |
| Pontypridd | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Portsmouth | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/2½ | 1/2½ | 1/2½ |
| Preston | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| Reading | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Rochdale | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Rochester | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Rugby | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/7½ |
| St. Albans | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| St. Helen's | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Scarborough | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Sheffield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 2/-½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Shrewsbury | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Southampton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Southend-on-Sea | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/5½ | 1/5½ | 1/5½ |
| Southport | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | | 1/5½-1/6½ | |
| South Shields | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Stockport | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Stockton-on-Tees | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Stoke-on-Trent | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/8½ | 1/5½ | 1/5½ | 1/5½ |
| Stroud | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| Sunderland | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Swansea | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |
| Taunton | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/6½ | 1/3½ | 1/3½ | 1/3½ |
| Torquay | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/5½ | 1/3½ | 1/3½ | 1/3½ |
| Wakefield | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/6½ | 1/6½ | 1/6½ |
| Walsall | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Warrington | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| West Bromwich | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/10½ | 1/8½ | 1/8½ | 1/8½ |
| Wigan | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | 1/11½ | | 1/7½-1/7½ | |
| Windsor | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Wolverhampton | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/8½ | 1/6½ | 1/6½ | 1/6½ |
| Worcester | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/7½ | 1/6½ | 1/4½ | 1/4½ | 1/4½ |
| York | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/9½ | 1/6½ | 1/6½ | 1/6½ |

The Masons' rate given is for bankers: fixers usually 1d. per hour extra. * War bonus of 3s. per week granted. † War bonus of 2s. per week granted. ‡ War bonus of 3s. 6d. per week granted. ‡‡ War bonus of 4s. per week granted. § War bonus of 7s. 6d. per week granted. ¶ These rates include the 12½ per cent. bonus. [The above rates, unless otherwise shown, are exclusive of 12½ per cent. bonus.—Ed.]

# COMPETITIONS, CONTRACTS, &c.

**For some contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this number. Contracts iv; Competitions iv; Public Appointments xcviii; Sales by Auction cii.; Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona fide tender unless stated to the contrary.**

***The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in; the name and address at the end is the person from whom or place where, quantities, forms of tender, &c., may be obtained.***

## BUILDING AND PAINTING.

APRIL 9.—**Brighton.**—SHED.—Extension of the Lewes-road car shed for the C.B. Tramways Depot, Lewes-road, Brighton.

APRIL 9.—**Huddersfield.**—HOUSES.—Erection of 104 houses, for Karrier Motors, Ltd. Mr. B. F. Gilman, architect, Rocksfield Hostel, Lockwood, near Huddersfield.

APRIL 9.—**Lambeth.**—Conversion of separate premises at Nos. 33 and 34, Guildford-road, South Lambeth, into five self-contained flats, for the Metropolitan Borough. Town Clerk, Lambeth Town Hall, Brixton Hill, S.W. 2.

APRIL 9.—**Staines.**—HOUSES, ROADS, &c.—Erection of 62 houses, road-making, fencing, &c., on five sites for the R.D.C. Mr. G. W. Manning, London-road, Ashford. Deposit, £3 3s.

APRIL 9.—**Woking.**—COTTAGES.—Erection of 59 pairs of cottages of four different types for the U.D.C. The Surveyor, Council Offices, Woking.

APRIL 10.—**Batley.**—HOUSING.—Erection of twenty houses for the T.C. Mr. H. L. Hall, Borough Engineer, Town Hall, Batley.

APRIL 10.—**Brentford.**—HOUSES.—Erection of 44 houses for the U.D.C. Mr. W. J. W. Westlake, Surveyor, Council Offices, Clifden House, Boston-road, Brentford. Deposit, £2 2s.

APRIL 10.—**Sheffield.**—EXTENSION.—Extension to sub-station, for the Electricity Dept. of the Corporation. Mr. S. E. Fedden, General Manager, Commercial-street, Sheffield. Deposit, £1 1s.

APRIL 10.—**Sheffield.**—HOUSES.—Erection of pair of houses, for the B.G. Clerk of Works, Fir Vale House, Sheffield.

APRIL 10.—**Stretford.**—HOUSES.—Erection of 252 houses on the Moss-road site, for the U.D.C. Mr. E. Worrall, Surveyor, Council Offices, Talbot-road, Old Trafford. Deposit, £1 1s.

APRIL 10.—**Towcester.**—HOUSES.—Erection of 48 for the R.D.C. Messrs. Jackson, Stopp, architects, Towcester.

APRIL 12.—**Biggleswade.**—HOUSES.—Erection of 40 houses for the U.D.C. Mr. Thos. Cosbrill, Architect, Council Offices, Biggleswade.

APRIL 12.—**Bourne.**—HOUSES.—Erection of eight houses for the U.D.C. Mr. H. R. Agnew, architect, Town Hall, Bourne. Deposit, £1 1s.

APRIL 12.—**Bucklebury.**—COTTAGES.—Erection of five pairs of cottages for the Bradfield R.D.C. Messrs. Wilcocks & Greenaway, architects, 11, Friar-street, Reading. Deposit, £1 1s.

APRIL 12.—**Darlington.**—WAGON WORKS.—Erection of wagon building works for the North Eastern Railway Co. Mr. A. Pollard, Company's Architect, at York.

APRIL 12.—**East Ashford.**—HOUSES.—Erection of 20 houses for the R.D.C. Clerk to the Council, 7, Bank-street, Ashford, Kent.

APRIL 12.—**Macclesfield.**—HOUSES.—24 houses on the Park House Estate. Mr. E. Hanson, Borough Surveyor, Town Hall, Macclesfield. Deposit £2.

APRIL 12.—**Poynings.**—COTTAGES.—Erection of four cottages for the Steyning East R.D.C. Surveyor, Town Hall, Southwick. Deposit, £1 1s.

APRIL 12.—**Romsey.**—HOUSES.—Erection of 29 houses, for the T.C. Mr. A. Haynes Johnson, architect, 95a, High-street, Winchester.

APRIL 12.—**Southend-on-Sea.**—HOUSES.—Erection of 15 for the Borough, on the Sutton-road site. Mr. Robert H. Dyer, Borough Engineer, Muncipal-buildings Southend-on-Sea.

*APRIL 12.—**Stourbridge.**—PAVILIONS.—Erection of pavilions, for 150 beds, alterations and additions to existing premises at Prestwood House, near Stourbridge. Mr. A. Eaton Painter, 43, Lichfield-street, Wolverhampton.

APRIL 12.—**St. Pierre.**—COTTAGES, ETC.—Erection of two pairs of cottages and out buildings for the Small Holdings Committee of the Monmouth County Council. Mr. A. Every-Clayton, County Land Agent, County Hall, Newport. Deposit £2 2s.

APRIL 12.—**Walthamstow.**—HOUSES.—Erection of 150 houses at Hale End for the U.D.C. Mr. G. W. Holmes, Engineer, Town Hall, Walthamstow. Deposit, £2 2s.

APRIL 12.—**Wigan.**—HOUSES.—The time for tendering for erection of 135 houses, for the T.C., has been extended to the 12th. Mr. R. B. Donald, Borough Engineer, Wigan. Deposit, £2 2s.

APRIL 12.—**Wootton Bassett.**—HOUSES.—Erection of 32 houses for the Cricklade and Wootton Bassett R.D.C. Mr. A. H. Master, architect, 42, Cricklade-street, Swindon. Deposit £1 1s.

APRIL 13.—**Ayr.**—HOUSES.—Erection of 12 houses at Hayhill and six at Dalrymple Village for the District Committee of the C.C. Mr. A. Stevenson, 14, Cathcart-street, Ayr.

APRIL 13.—**Burntisland.**—HOUSES.—Erection of 30 houses at Rossend site, for the T.C. Burgh Surveyor, Burntisland. Deposit, £2 2s.

APRIL 13.—**Keadue.**—HOSPITAL.—For completion of Keadue Hospital, for the Cavan C.C. Mr. W. Finlay, Secretary, Court House, Cavan.

APRIL 13.—**Kingston-on-Thames.**—REPAIRS, &c.—For repairs and painting to the workhouse, Norbiton, or the Board of Guardians. Mr. W. H. Hope, architect, Juppsland, Billinghurst. Deposit, £1. 1s.

APRIL 13.—**Lanchester.**—HOUSE.—Erection of house and garage for the Lanchester Christ Hospital Board. Mr. G. T. Wilson, architect, 21, Durham-road, Blackhill.

APRIL 13.—**Rochford.**—PAINTING.—For external painting at Poor Law Institution of the Board of Guardians. The Master, Institution, Rochford.

APRIL 14.—**Bristol.**—HOSPITAL BUILDINGS.—Erection of two pavilions etc., at Ham Green Sanatorium for the Corporation. Mr. L. S. McKergie, City Engineer, Bristol. Deposit £1 1s.

*APRIL 14.—**Chichester.**—HOUSES.—Erection of 26 houses for the T.C. Mr. F. J. Lobley, City Engineer. Chichester.

APRIL 14.—**Derby, &c.**—PAINTING.—Cleaning and painting at Derby, Staveley, Long Eaton, &c., for the Midland Railway Co. (Four contracts.) Engineers' Offices, Derby.

APRIL 14.—**Epsom.**—COTTAGES.—Erection of 36 at Upper Mulgrave-road, Cheam, for the R.D.C. Mr. A. W. Tribe, architect, Denison House, Westminster.

APRIL 14.—**Guiseley.**—HOUSES.—Erection of 12 houses for the U.D.C. Mr. H. Chippendale, architect, Springfield, Guiseley, Leeds. Deposit £1 1s.

APRIL 14.—**Manchester — SCHOOL.** — Completion of the Orford-street Municipal School, Cheetham, Manchester, for the E.C. Education Offices, Deansgate, Manchester.

APRIL 14.—**Margate & London, S.W.**—REPAIRS AND PAINTING.—(1) Cleaning, painting, and alterations to old building at Princess Mary's Hospital for Children, Cliftonville, Margate; (2) external and internal painting and repairs at the Fountain Temporary Mental Hospital, Tooting, S.W., for the Metropolitan Asylums Board.

APRIL 14.—**Newport (Salop).**—HOUSES.—Erection of 28 houses for the U.D.C. Mr. F. H. Shayler, architect. 10, Gateway-chambers, Shrewsbury. Deposit, £1 1s.

APRIL 14.—**Rawdon.**—HOUSES.—Erection of 22 houses for the U.D.C. Mr. H. Chippendale, architect, Springfield, Guiseley. Leeds Deposit £1 1s.

APRIL 14.—**Teddington — HOUSES,** &c.—Erection of 124 of various types and sewer construction and road-making, in connection therewith. Mr. G. H. Salmons, Clerk to the Council, Elmfield House, Teddington.

APRIL 14.—**Tipton.**—HOUSES.—Erection of 52 houses, for the U.D.C. Mr. J. P. Clerk, architect, Regent-chambers, Wednesbury. Deposit, £3 3s.

APRIL 15.—**Andover.**—HOUSES.—Erection of 33 houses, with drainage works, &c., for the T.C. Borough Surveyor, Town Hall, Andover. Deposit £1 1s.

APRIL 15.—**Bakewell.**—HOUSES.—Erection of 24 houses, for the R.D.C. Mr. C. Flint, architect, 5, The Quadrant, Buxton. Deposit, £1 1s.

APRIL 15.—**Chatteris — HOUSES.** — Erection of 20, for the U.D.C. Mr. S. Hipwell, architect, Surveyor's Office, Chatteris.

APRIL 15.—**East Dereham.**—HOUSES.—Erection of 10 houses for the U.D.C. Mr. G. J. Skipper, architect, 7, London-street, Norwich.

APRIL 15.—**Hull.**—STABLES.—Erection of stables, &c., at West Dock-street Depot for the Corporation. Mr. J. H. Hirst, City Architect, Guildhall, Hull. Deposit, £2 2s.

APRIL 15.—**Shepton Mallet.**—COTTAGES.—Erection of 16 cottages at Evercreech and construction of road and sewers, for the R.D.C. Mr. A. J. Allen, architect, Council offices, Shepton Mallet Deposit, £2 2s.

APRIL 15.—**Winchester.**—ENGINEERS' HOUSE AND 12 COTTAGES.—Erection of, for the employees at Park Prewett Mental Hospital. Messrs. G. T. Hine & Pegg, architects, 35, Parliament-street, Westminster, S.W.1

APRIL 16.—**Barnham.**—COTTAGES.—Erection of 32 cottages on Barnham and Choller estates, for the West Sussex C.C. Mr. H. P. Roberts, County Architect, Thurloe House, Worthing. Deposit, £1 1s.

APRIL 16.—**Bodmin.**—FARM BUILDINGS.—Erection of house and farm buildings at Green-lane Farm for the T.C. Mr. R. T. Buscombe, Borough Surveyor, Municipal Offices, Bodmin.

APRIL 16.—**Burry Port.**—EXTENSION.—Extension of Burry Port Co-operative Society's central premises. Quantities at premises. Deposit, £1 1s.

APRIL 16.—**Cosford.**—HOUSES.—Erection of 42 houses in various parishes, for the R.D.C. Mr. L. Crowfoot, Long Melford, Sussex. Deposit, £2 2s.

APRIL 16.—**Deptford.**—HOUSES.—Erection of 187 houses for the B.C. Borough Surveyor, Town Hall, New Cross-road, Deptford. Deposit, £3 3s.

APRIL 16.—**East Sussex.**—LAVATORIES.—New, and alteration to existing, at East Grinstead Public Elementary Council School. Mr. F. J. Wood, M.S.A., County Surveyor's Dept., County Hall, Lewes.

APRIL 16.—**Fordingbridge.**—HOUSES.—Erection of 20 cottages at Fordingbridge and 12 at Martin for the R.D.C. Mr. E. Bird, architect, Castle-lane, Southampton. Deposit, £2 2s.

APRIL 16.—**Northwich.**—HOUSES AND ROADS.—Erection of 100 houses and construction of roads and sewers for the U.D.C. Mr. J. A. Cowley, Clerk, Northwich. Deposit, £2 2s. each contract.

APRIL 16.—**Ovenden.**—WORKSHOP.—Erection of engineer's workshop in Shay-lane. Mr. W. Hall, architect, 1, Harrison-road, Halifax.

APRIL 16.—**Sibsey.**—COTTAGES.—Erection of pair of cottages at Frithville and pair at Sibsey, for the R.D.C. Mr. O. B. Giles, Clerk, 28, Wide Bargate, Boston. Deposit, £2 2s.

APRIL 16.—**West Sussex.**—COTTAGES.—Erection of 32, for the C.C. Mr. Hayden P. Roberts, F.R.I.B.A., County Architect, Thurloe House, Worthing.

APRIL 17.—**Barnsley.**—HOUSES.—Erection of 220 houses for the T.C. Messrs. Dyson, Coles & Cawthorne, architects, 10, Regent-street, Barnsley.

*APRIL 17.—**Bexley Heath.**—HOUSES.—Erection of 426 houses or part of that number in connection with the Welling Housing Scheme. Mr. W. T. Howe, Surveyor to the Council, Council Offices, Bexley Heath.

APRIL 17.—**Maldon.**—HOUSES.—Erection of 16 houses, for the T.C. Mr. T. R. Swales, Borough Engineer, Maldon.

APRIL 17.—**Seghill.**—HOUSES, ROADS, ETC.—For erection of 40 houses and construction of roads and sewers for the U.D.C. Messrs. Knowles, Oliver & Leeson, architects, 25, Collingwood-street, Newcastle-on-Tyne, Deposit £2 2s.

*APRIL 17.—**Steyning, Sussex.**—COTTAGES.—Erection of 16 at Lansing, and 40 at Henfield, for the R.D.C. Mr. F. A. Crouch, 47, Worcester Villas, Hove.

APRIL 18.—**Tonbridge.**—HOUSES.—Erection of 138 houses in various parishes for the R.D.C. Mr. F. Harris, surveyor, Broadway, Southborough, Tunbridge Wells. Deposit, £2 2s.

APRIL 19.—**Aspatria.**—ALTERATIONS.—Alterations, etc. to Central Stores for the Aspatria Industrial Co-operative Society. Mr. H. Bedfield, architect Workington.

APRIL 19.—**Cardiff.**—PAINTING.—Painting and colouring various schools for the T.C. Mr. J. J. Jackson Director of Education, City Hall, Cardiff.

APRIL 19.—**Hessle.**—HOUSES.—Erection of 54 houses for the U.D.C. Mr. J. M. Dossor, architect, Waterloo Chambers, Hull. Deposit £2.

*APRIL 19.—**Lewisham.**—HOUSES.—Erection and completion of 30 on the Lewisham Park site for the Metropolitan Borough. Borough Surveyor, Town Hall, Catford, S.E.6.

APRIL 19.—**Newton Abbot.**—HOUSES.—Erection of houses, in pairs, in the following parishes:—Chudleigh (12), Ipplepen (16), Kingsteignton (16), Moretonhampstead (16), Chudleigh Knighton (8) for the R.D.C. Mr. F. Horner, Clerk, 64, East-street, Newton Abbot.

APRIL 19.—**West Riding of Yorkshire.**—COTTAGES &c.—Erection of cottages and homesteads at Hawksworth, Pottleton, Rufforth and Bythen, for the West Riding Small Holdings Committee. Architect, Small Holdings Committee, County Hall, Wakefield.

APRIL 20.—**Leeds.**—HOUSES.—Erection of 34 houses on Wythen House Estate, for the Corporation Mr. W. T. Lancashire, City Engineer, Leeds. Deposit £1 1s.

APRIL 21. — **Barnet.** — COTTAGES. — Erection of 24 cottages at Harris-lane, Shenley, for the R.D.C. Clerk, Council Offices, Boreham Wood.

APRIL 21.—**Fulham.**—PAINTING.—Cleaning and painting Central Library for the B.C. Borough Surveyor, Town Hall, Fulham.

*APRIL 21.—**Hackney.**—REPAIRS. PAINTING.—Renewals to woodwork painting exterior and portions of interior at the Public Baths, Central Library, and three branch libraries. Borough Engineer and Surveyor, Town Hall, Hackney, E. 8.

APRIL 21.—**Hemsworth.**—HOUSES AND ROADS.—Erection of 20 houses and construction of roads and sewers for the R.D.C. Mr. W. T. Lynam, Surveyor Council Offices, Hemsworth. Deposit £1 1s.

*APRIL 22.—**Castle Donington.**—HOUSES.—Erection of 30, also street making and sewers for the R.D.C. Messrs. Arthur Eaton & Son, 6, St. James-street, Derby.

*APRIL 22.—**Kensington.**—Demolition of the existing workhouse buildings at Mary-place, Notting-hill, and the erection of 8 cottages for the Royal Borough. Borough Engineer, Town Hall, Kensington, W.8.

APRIL 22.—**Manchester.**—REPAIRS.—Repairs at Art Gallery, at Heaton Park, for the Corporation. City Architect, Town Hall, Manchester. Deposit, £1 1s.

APRIL 22.—**Prestwich.**—HOUSES.—Erection of 141 houses, for the U.D.C. Mr. C. H. Morgan, Engineer, Town Hall, Prestwich. Deposit, £2 2s.

APRIL 22.—**Southwark.**—PAINTING.—Painting and cleaning at the Infirmary, for the B.G. Mr. A. Saxon Snell, architect, 9, Bentinck-street, W. Deposit, £5.

*APRIL 22.—**Wandsworth, S.W.**—PAINTING.—To be carried out at the Infirmary for the Guardians, St. John's Hill, Wandsworth, S.W. 18. Mr. F. J. Curtis, Clerk, Union Offices, St. John's Hill, Wandsworth, S.W. 18.

APRIL 23.—**Hurlingham.**—STANDS.—Erection of temporary or permanent stands to accommodate 30,000 spectators, for the Committee. Lt.-Col. A. A. Duff, manager, Hurlingham Club, Fulham, S.W.

APRIL 23.—**London.**—ENGINE HOUSE, &c.—Erection of engine house, cottage, &c., at Shooters'-hill, for the Metropolitan Water Board. Chief Engineer's Dept., South-place, Finsbury-pavement, E.C. Deposit, £5.

APRIL 24.—**Brampton.**—HOUSING.—Erection of six houses at Holymoorside for the U.D.C. Mr. B. Deeping, architect, Glumen Gate, Chesterfield.

*APRIL 24.—**Horsham.**—HOUSES.—(1) Contract No. 15, two pairs; (2) Contract No. 18, four pairs; (3) Contract No. 19, four pairs. Mr. W. R. Guilford, Surveyor to the Council, Albion-terrace, Horsham.

*APRIL 24.—**London.**—Repairs and painting and other works, at the Infirmary, Rackham-street, Notting-hill, for the Guardians of the Poor of the parish of St. Marylebone. Steward of the Infirmary.

APRIL 24.—**Stafford.**—INSTITUTE.—Erection of a county mining institute, at Ford Green, Smallthorne, for the E.C. Director of Education, County Education Offices, Stafford.

APRIL 24.—**Wortley.**—HOUSES.—Erection of 112 houses at Ecclesfield for the R.D.C. Mr. Wynyard Dixon, architect, Hartshead, Sheffield. Deposit £2 2s.

*APRIL 26.—**London.**—Flooring and reflooring to pipe ducts in the wards at their Workhouse, Northumberland-street, W., for the Guardians of the parish of St. Marylebone. Mr. A. Saxon Snell, architect, 9 Bentinck-street, W. 1.

*APRIL 26.—**Surbiton.**—HOUSES.—Erection of 50 at Surbiton-hill for the U.D.C. Council Offices, Surbiton.

APRIL 28.—**Newport Pagnell.**—HOUSES.—Erection of 10 for the R.D.C. Mr. W. B. Stonebridge, M.S.A., architect, 28, St. John's-street, Bedford.

*APRIL 29.—**Greenwich.**—PAINTING AND REPAIRS.—External painting and general repairs at the Infirmary of the Greenwich Union, Vanbrugh-hill, East Greenwich. Mr. Louis Jacob, Board's Surveyor, 30, Bloomsbury-square, W.C. 1.

*APRIL 30.—**Gellygaer.**—HOUSES, ROADS, AND SEWERS.—(1) Construction of roads and sewers; (2) Erection and completion of sixty-six houses in pairs. Mr. W. P. Jones Williams, architect, Council Offices, Ringwell, Glam.

MAY 10.—**Tilbury.**—HOUSES.—Erection of 1,520 houses, for the U.D.C. Mr. S. A. Hill-Willis, engineer, Council offices, 47, Dock-road, Tilbury. Deposit, £10 10s.

NO DATE.—**Bakewell.**—HOSPITAL.—Erection of Memorial Cottage Hospital. Mr. J. E. Bladon, 12, Pressons-row, Liverpool.

*NO DATE.—**Chertsey.**—HOUSES.—Erection of 22, also road making for the U.D.C. Messrs. Kenneth Wood and John Sarvis, Old Bank Chambers, Woking, Surrey.

NO DATE.—**Ilkley.**—RESIDENCE.—Erection of residence near Ilkley. Mr. T. T. Scott, architect, 36, Lowther-street, Carlisle. Deposit £1.

*NO DATE.—**Lewisham, S.E.**—HOUSES.—Labour in all trades for erection of demi-detached houses. Architect, 8, Cromwell-Place, South Kensington.

NO DATE.—**Lutterworth.**—HOUSES.—Erection of 14 houses for the R.D.C. Messrs. Fosbrooke & Biddlesfield, 1, Museum-square, Leicester. Deposit £1 1s.

*NO DATE.—**Salop.**—Alterations and additions to Technical Institute, Oswald-road, Oswestry, for the C.C. Mr. W. H. Pendlebury, Secretary for Higher Education, County Buildings, Shrewsbury.

## FURNITURE, MATERIALS, etc.

APRIL 9.—**St. Marylebone.**—PAVING BLOCKS.—Supply of 500,000 creosoted Swedish deal paving blocks, for the B.C. Mr. J. Paget Waddington, Borough Surveyor, Town Hall, Marylebone.

APRIL 12.—**Glasgow.**—MATERIALS;—Supply of materials to the Gas Dept. Mr. J. W. M'Lusky, general manager, 45, John St., Glasgow.

APRIL 12.—**Manchester.**—STORES.—Supply of stores for the Paving, Sewering and Highways Committee. Paving Dept., Town Hall, Manchester.

APRIL 12.—**Rye.**—MATERIALS.—Supply of materials for the R.D.C. Mr. H. J. Elliott, Winchelsea, Sussex.

APRIL 13.—**Faversham.**—Supply of road material for the R.D.C. Mr. J. G. Chittenden, Surveyor, Ashford-road, Faversham.

APRIL 13.—**Leith.**—MATERIALS.—For supply of materials to the T.C. Borough Surveyor, Council Chambers, Leith.

APRIL 14.—**Reigate.**—MATERIALS.—Supply of materials, for the T.C. Mr. F. T. Clayton, Borough Engineer, Reigate.

APRIL 14.—**Milnrow.**—MATERIALS.—Supply of materials, for the U.D.C. Mr. R. R. Jones, Surveyor, Council Offices, Milnrow.

APRIL 14.—**Wood Green.**—MATERIALS.—Supply of highway materials, for the U.D.C. Mr. W. P. Harding, Clerk, Town Hall, Wood Green.

APRIL 19.—**Tenterden.**—MATERIALS.—Supply of road materials to the T.C. Mr. W. L. C. Turner, Borough Surveyor, Town Hall, Tenterden.

## ENGINEERING, IRON AND STEEL.

APRIL 9.—**Aberdeen.**—GIRDERS, &c.—Supply of steel girders and flooring for the renewal of bridges, for the Great North of Scotland Railway Co. Mr. J. H. Parker, engineer, 80, Guild-street, Aberdeen. Deposit, £1 1s.

APRIL 9.—**Chelmsford.**—HEATING.—Heating and hot water supply to diphtheria block of Isolation Hospital, for the Joint Hospital Board. Messrs. Charles & W. H. Pertwee, architects, The Institute, Chelmsford.

APRIL 13.—**London.**—RAILWAY MATERIAL.—Supply of laminated bearing springs, for the South Indian Railway Co. Mr. R. White consulting engineer, 4, Victoria-street, S.W. Charge, 10s.

APRIL 14.—**Glasgow.**—ELECTRIC INSTALLATION.—For installation of electric lighting at Knightswood Hospital for the T.C. Office of Public Works, Glasgow.

APRIL 14.—**Margate.**—ENGINEERING WORK.—Installation of new steam boiler, ironing machine pipe work and engineering work at Princess Mary's Hospital, for the Metropolitan Asylums Board. Office of Board, Embankment, E.C. Deposit, £1.

APRIL 17.—**Banbridge.**—BRIDGE.—Reconstruction of steel bridge over River Bann at Banbridge, for the Great Northern (Ireland) Railway Co. Engineer, Belfast. Deposit. £2 2s.

APRIL 24.—**Guernsey.**—TOWER.—Erection of concrete tower on Roustel Rock, in Little Russel-passage, for St. Peter Port Harbour Committee. Mr. J. H. Duquemin, States Engineer, Guernsey.

APRIL 26.—**Lichfield.**—HEATING.—Heating of Corn Exchange, for the T.C. Mr. P. H. Benn, Surveyor, Guildhall, Lichfield. Deposit, £1 1s.

MAY 1.—**Manchester.**—GAS WORKS.—Construction of two retort-houses and vertical retort installations on the continuous system, coal and coke handling plant, &c., at the Bradford-road Station, for the Gas Committee. Superintendent, Gas Department, Town Hall, Manchester. Deposit, £2 2s.

MAY 11.—**Liverpool.**—PUBLIC WASH-HOUSE.—Engineering work required in addition to public washhouse for the Corporation. Engineer, Baths Department, Municipal Buildings, Liverpool. Deposit, £1 1s.

## ROAD, SANITARY, AND WATER WORKS.

APRIL 9.—**Chorley.**—ROADS.—Construction of roads and sewers at Anderton, Coppull, Clayton, Eccleston and Buxton, for the R.D.C. Mr. J. B. Jolly, architect, 9, High-street, Chorley. Deposit, £1.

APRIL 9.—**Huddersfield.**—MAKING-UP.—Making-up site for houses at Lockswood, for the Karrier Motor, Ltd. Mr. E. F. Gilman, architect, Lockwood, Huddersfield. Deposit, £2 2s.

APRIL 9.—**Lochgelly.**—ROADS, &c.—Construction of streets, sewers, water and gas mains in connection with housing scheme of the T.C. Mr. A. Lumsden, Borough Surveyor, Lochgelly. Deposit £2 2s.

APRIL 9.—**Port Glasgow.**—FILTERS.—Construction of two additional filters, for the T.C. Messrs. Crouch and Hogg, engineers, 14, Blythswood-square, Glasgow. Deposit £2 2s.

APRIL 9.—**Tividale.**—SEWERAGE WORKS.—Construction of settling tank, filter bed, &c., at Tividale, near Dudley, for the Upper Stour Valley Main Sewerage Board. Mr. W. Fiddian, engineer, 7, Church-street, Stourbridge. Deposit, £3 3s.

APRIL 9.—**Turdale.**—SEWERS.—Reconstruction of sewers in Cradley for the Upper Stour Valley Main Sewerage. Mr. W. Fiddian, engineer, 7, Church-street, Stourbridge. Deposit, £3 3s.

APRIL 10.—**Leeds.**—ROADS.—For making up Thomas, street, for the U.D.C. Mr. J. W. Liversege, Surveyor, Council offices, Leeds.

APRIL 10.—**Loughborough.**—SEWER.—257 lineal yards of 12 in. and 180 yards of 9 in. sewer. Mr. A. H. Walker, Borough Engineer, Loughborough. Deposit £2 2s.

APRIL 10.—**Portslade.**—SEWER.—Construction of 160 yd. of 18 in. sewer, &c., for the Portslade and Southwick Outfall Sewerage Board. Mr. J. S. Alford, engineer, 11, Victoria-street, Westminster, S.W. Deposit, £1.

APRIL 10.—**Spenborough.**—ROAD.—Construction of road in connection with sewerage scheme for the U.D.C. Mr. A. Rothers, surveyor, Town Hall, Cleckheaton. Deposit £2.

APRIL 12.—**Bolton-upon-Deane.**—SANITARY.—For plumbers' works in connection with conversion of privies at Goldthorpe for the U.D.C. Mr. T. Robinson, Sanitary Inspector, Bolton-upon-Deane.

APRIL 12.—**Camberwell.**—Providing and laying of compressed asphalte in various roads for the Borough. Mr. Frederick S. Slater, Borough Engineer, Town Hall, Camberwell, S.E.5.

APRIL 12.—**Earsdon.**—ROADS, ETC.—Construction of roads and sewers on Balkworth Village housing site for the U.D.C. Mr. T. R. MacMillen, Surveyor, Council Offices, Shiremoor. Deposit £1.

APRIL 12.—**Islington.**—CULVERT.—Construction of reinforced concrete culvert at the Cemetery, East Finchley, for the B.C. Superintendent of the Cemetery, East Finchley.

APRIL 12.—**Manchester.**—MAKING UP.—For making up roads on Catterick Hall housing estate for the T.C. City Engineer, Town Hall, Manchester.

APRIL 12.—**Mansfield.**—STREET WORKS.—Street works and sewering, for the T.C. Mr. W. Thompson, Borough Engineer, Market-street, Mansfield. Deposit. £2 2s.

APRIL 12.—**Swansea.**—ROADS AND SEWERS.—Road making, &c., at Pontardulais and Gowerton, for the R.D.C. Mr. J. T. J. Williams, architect, 8, Temple Buildings, Goat-square, Swansea. Deposit, £2 2s.

APRIL 12.—**Wallsend.**—SANITARY.—Erection of four water closets at Wellington Quay, for the T.C. Town Hall, Wallsend.

APRIL 13.—**Deptford.**—WOOD PAVING.—Wood paving carriageways on side of tramway tracks (ave. 31,100 yds.), for the B.C. Mr. H. M. Lawson, Borough Surveyor, Town Hall, Deptford, S.E.

APRIL 13.—**Romford.**—STREET WORKS.—(a) Wood paving in High-street, &c.; (b) tarred slag macadam roading in London-road, for the U.D.C. Mr. F. G. Beaumont, Surveyor, Council Offices, Romford. Deposit £2 2s.

APRIL 13.—**Skegness.**—ROADS, &c.—Construction of roads and sewers on housing site, for the U.D.C. Mr. H. H. Jenkins, Surveyor, Council offices, Skegness. Deposit, £1.

APRIL 14.—**Beddington.**—ROADS AND SEWERS.—Construction of roads and sewers on Demesne Estate, Wallington, for the U.D.C. Mr. S. F. R. Carter, Surveyor, Council offices, Wallington. Deposit, £2 2s.

APRIL 14.—**Llantrisant.**—ROAD.—Completion of certain roads for the R.D.C. Mr. T. Saunders, Surveyor, School-street, Pontyclun. Deposit, £5.

APRIL 15.—**Southampton.**—DRAINS.—Construction of drains to houses at Hampton Park, for the T.C. Borough Engineer, 123, High-street, Southampton. Deposit, £2 2s.

APRIL 15.—**Sutherland.**—ROADS.—For reconstructing roads, for the C.C. Mr. R. Grant, Surveyor, County-road, Golspie.

APRIL 16.—**Doncaster.**—SEWERAGE WORKS.—Construction of sewerage works at Armthorpe, for the R.D.C. Mr. W. R. Crabtree, Union Offices, Doncaster. Deposit, £2 2s.

APRIL 16.—**East Grinstead.**—SANITARY WORK.—Erection of new and alterations to existing lavatories at Council Schools, for the East Sussex E.C. Mr. F. J. Wood, County Surveyor, County Hall, Lewes.

APRIL 20.—**Wealdstone.**—ROADS.—(a) Re-surfacing High-street and High-road; (b) making up footpaths with stone, for the U.D.C. Mr. H. Walker, Surveyor, Council Offices, Wealdstone.

APRIL 21.—**Neison.**—WATERWORKS.—(1) Supply of 880 tons of cast-iron pipes; (2) constructing road and laying pipes, for the T.C. Mr. C. E. Newton, engineer, 19, Cooper-street, Manchester.

APRIL 22.—**Beaconsfield.**—ROADS AND SEWERS.—Construction of roads and sewers on housing site. Mr. H. C. Lander, architect, Letchworth. Deposit, £1 1s.

APRIL 23.—**Chertsey.**—SEWERAGE WORKS.—For sewerage works, for the U.D.C. Mr. G. Midgley Taylor, 36, Victoria-street, Westminster, S.W. Deposit, £5.

APRIL 24.—**Wortley.**—ROADS.—Construction of roads and sewers at Ecclesfield housing site for the R.D.C. Mr. F. Thuriby, Surveyor, Council Offices, Greenside, Sheffield. Deposit £1 1s.

*APRIL 28.—**Pontypridd.**—SEWER.—Diversion of main [illegible] and Gyferlion, near Pontypridd for the Ystradyloguy and Pontypridd Main Sewerage Board. Mr. W. Nicholas, Clerk, Mill-street, Pontypridd Deposit £3 3s.

## Auction Sales, Tenders, &c.

APRIL 9.—**Bartley.**—Messrs. Richard Austin & Wyatt will sell at the "Station Hotel," Totton, standing timber. Mr. J. H. Sampson, J.P., the Estate Office, Minstead, Lyndhurst.

APRIL 12.—**Tring, Herts.**—Messrs. W. Brown & Co., will sell at the Rose and Crown Hotel, Tring, 10 freehold building sites. W. Brown & Co., auctioneers, Tring.

APRIL 12 AND 13.—**Beverley Brook.**—Messrs. Allsop & Co. will sell by direction of the Disposal Board, at No. 2 Balloon Training Depot, Beverley Brook, huts, building and builder's plant. Catalogues, 141, Park-road, Regent's Park, N.W. 8.

APRIL 13.—**Woolwich Arsenal.**—Messrs. J. T. Skelding & Co., will sell by direction of the Disposal Board, Temporary Hospital and Equipment at the Royal Arsenal. Auctioneers: J. T. Skelding & Co., 48, Gresham-street, Guildhall, E.C.2.

APRIL 13.—**Exeter.**—Messrs. Joseph Hibbard & Sons, will sell by order of the Disposal Board, at the Quicke Estate, near Newton St. Cyres Station, L. & S.W. Rly., four miles from Exeter, stock of well-cut English timber. Auctioneers, Newington Green, Islington, N.

APRIL 13.—**Studley.**—Messrs. J. Hibbard & Sons will sell, on the premises of Messrs. Beint & Sons' Mill, Studley, well cut stock of prime ash, 60,000 cube ft., cut into planks of all thicknesses. Catalogues, Auctioneer, Newington Green, N.

APRIL 14.—**Cleeve (Somerset).**—Messrs. Joseph Hibbard will sell, by order of the Board of Trade, on the Mill site, Cleeve, Somerset, well cut stock of English timber. Auctioneers, Newington Green, Islington, N.1.

APRIL 14.—**Epsom.**—Messrs. Fuller, Moon & Fuller will sell, by direction of the Disposal Board, at R.E. stores, Woodcote Park, huts, building materials and stores. Auctioneers, 83, High-street, Croydon, and High-street, Epsom.

APRIL 14.—**Hatfield.**—Messrs. Hubert & Flint will sell, with possession, at Winchester House, E.C., the important freehold manufacturing premises, known as the Hatfield Brewery. Auctioneers: 11, Searle-street, Lincoln's-inn, W.C. 2.

APRIL 14.—**Quedgeley.**—Messrs. Bruton Knowles & Co. will sell by direction of the Disposal Board at H.M. No. 5 National Filling Factory, Quedgeley (near Gloucester), paint, &c., about 15 tons. Auctioneers, Albion Chambers, Gloucester.

APRIL 14 AND 15.—**Feltham, Middlesex.**—Messrs. E. & S. Smith will sell, by order of the Disposal Board, at the Aircraft Acceptance Park (Q Stores Dept., R.A.F.), Feltham, valuable constructional ironwork, ironmongery, timber, building materials and plant. Auctioneers, Carlton House, 68, Great Queen-street, Kingsway, W.C. 2.

*APRIL 15.—**Vauxhall, S.E.**—Messrs. Joseph Hibbard & Sons will sell by order of the Mortimer Saw Mills, surplus plant (saw mill plant). Catalogues of Auctioneers, Newington-green, Islington, N.

*APRIL 16.—**Lyndhurst, Hants.**—Messrs. Waller & King will sell by direction of the Disposal Board at the War Dogs School, Lyndhurst, Hants, hutting, etc. Auctioneers, 17, Above Bar, Southampton.

*APRIL 20.—**Beachley, near Chepstow.**—Messrs. Fuller, Horsley Sons & Cassell will sell by direction of the Disposal Board, in lots, at the Grand Hotel, Bristol, contractors' plant, cranes, locos., and other machinery, new vertical motor-driven air compressors by Fullerton, &c. Auctioneers, 11, Billiter-square, E.C. 3.

APRIL 20.—**Bristol.**—Messrs. Fuller, Horsey & Co. will sell, at the Grand Hotel, contractors' plant from the National Shipbuilding Yard, Beachley. Catalogues from the Auctioneers' Offices, 11, Billiter square, E.C. 3.

*APRIL 20.—**Homerdon, Devon.**—Messrs. Joseph Hibbard & Sons will sell by order of the Board of Trade, at Shaddlewood Mill, South Devon, well-cut stock of hard and soft woods. Auctioneers, Newington Green, Islington, N.

*APRIL 21.—**Manadon, S. Devon.**—Messrs. Joseph Hibbard & Sons, will sell by order of the Board of Trade, on the Mill site, Manadon, a stock of well-cut timber. Auctioneers, Newington Green, Islington, N.1.

*APRIL 22.—**Avington, Winchester.**—Messrs. Joseph Hibbard & Sons will sell without reserve by order of Messrs. Timber Trades Services, Ltd., at Shelley-Rolls Estate, stock of English timber comprising about 40,000 feet cube. Auctioneer, Newington-green, Islington, N.

APRIL 27,-28.—**London, S.E.**—Messrs. Green & Son will sell by direction of the Disposal Board, Huts and Corrugated iron buildings, at the R.A.S.C. Depot, Blackheath. Auctioneers, 72, King-street, Hammersmith.

✱APRIL 27.—**Slough.**—Messrs. Bradshaw Brown & Co. will sell, by direction of the Disposal Board, plant and machinery at the Motor Transport Depot, Slough. Auctioneers, Billiter-square Buildings, London, E.C. 3.

✱APRIL 27 AND 28.—**Washford, Somerset.**—Messrs. Joseph Hibbard & Sons, will sell by direction of the Board of Trade, at the Mills, Washford, Somerset, well-cut stock of English timber. Auctioneers, Newington Green, Islington, N.1.

✱APRIL 28.—**Betchworth, Surrey.**—Messrs. John Churchman & Sons will sell by order of Messrs. Joseph Gardner & Sons (who are relinquishing the English timber trade), valable plant, machinery and timber, including 4 active heavy draught horses. Auctioneers, Horsham, Sussex.

APRIL 29.—**Kensington.**—Messrs. Daniel Watney & Sons will sell at Winchester House, Old Broad-street, important freehold estate situate close to Gloucester-road Station, Kensington.

APRIL 29.—**Near Eltham, Kent.**—Messrs. Daniel Watney & Sons will sell about 64 acres of freehold building land. Particulars, 4A, Frederick-place, Old Jewry, London, E.C. 2.

✱MAY 4.—**London, E.C.**—Mr. Joseph Stower will let by auction at Winchester House, Old Broad-street, No. 23 and 25, Maddox-street, on a building lease for 99 years, with vacant possession. Auctioneers, 43, Chancery-lane, W.C.

✱MAY 6.—**Salfords, Surrey.**—Messrs. Joseph Hibbard & Sons will sell by Order of the Board of Trade, at the Depot, Salfords Mill, stock of hard and soft woods. Auctioneers, Newington-green, Islington, London, N. 1.

## Competitions.

*(See Competition News, page 412.)*

## Public Appointments.

APRIL 10.—**Barnack, Easton & Ketton.**—Clerk of Works for the R.D.C.'s. Salary £7 per week. Clerk to the Councils, 25, Broad-street, Stamford.

APRIL 10.—**Bradford.**—Quantity Surveyor for the City. Mr. W. Williamson, City Architect, Town Hall, Bradford.

APRIL 10.—**Gellygaer.**—General Assistant. Salary £250 per annum. Junior Assistant. Salary £156 per annum, for the U.D.C. Clerk to the Council, Council Offices, Hengoed, Glam.

APRIL 10.—**Leeds.**—INSTRUCTOR.—Assistant Instructor in the Architectural Department of the Leeds School of Art. Salary, from £250 to £300, according to qualifications and experience.

APRIL 10.—**London.**—Assistant Instructors in handicraft (woodwork). For the L.C.C. Salary £150 a year, rising by yearly increments of £10 to £240. Education Officer (K.2) London County Council Education Offices, Victoria Embankment, W.C.2.

APRIL 12.—**Billericay.**—Assistant Surveyor required by the R.D.C. Salary, £200 per annum. Mr. C. Edgar Lewis, Clerk to the Council, New-road, Brentwood

APRIL 12.—**York.**—Three temporary Architectural Assistants required by the city. Mr. F. W. Spurr, City Engineer, Guildhall, York.

APRIL 13.—**Durham.**—Superintendent of Works, also Heating Engineer required by the Education Department, Director of Education, Shire Hall, Durham.

✱APRIL 13.—**Somerset.**—Assistant Architect in the Small Holdings Department. £400 per annum. Secretary, 68, Boulevard, Weston-super-Mare.

APRIL 14.—**Southampton.**—Accomntant and Junior Quantity Surveyor for a period of not less than one year, for the County. Salary at the rate of £250 per annum, including War Bonus.

APRIL 15.—**Crewe.**—Temporary Housing Clerk for the Borough. Salary £220 per annum.

✱APRIL 19.—**Barrow-in-Furness.**—Assistants. Two required in the Borough Surveyor's office. "Assistant,' Borough Engineer and Surveyor, Town Hall, Barrow-in-Furness.

APRIL 19.—**Brownhills.**—Architectural Assistant required by the U.D.C. Mr. Geo. F. Grimwood, Council's Architect, Public Offices, Brownhills.

APRIL 19.—**Monmouth.**—Clerk of Works and Costing and General Clerk for the Ebbw Vale U.D.C. Housing Scheme. Mr. P. I. Davies, Housing Architect, Council Offices, Ebbw Vale, Monmouth.

APRIL 19.—**Walsall.**—Building Inspector, for the County Borough. Salary £250 per annum.

APRIL 9.—**West Riding of Yorks.**—Architectural Assistant for the C.C. Education Architect, County Hall, Wakefield.

✱APRIL 29.—**Wandsworth, S.W.**—Sanitary Inspector required by the Metropolitan Borough. D. A. Nicholl, Town Clerk, Council House, Wandsworth, S.W. 18,

✱APRIL 30.—**Calcutta.**—City Architect required for Corporation of Calcutta, India. Salary Rs.1,500 per month, Secretary to the Corporation of Calcutta, Central Municipal Office, Calcutta.

✱NO DATE.—**Cheshunt.**—Architects' Assistant for the U.D.C. J. E. Sharpe, Surveyor, Manor House, Cheshunt, Herts.

✱NO DATE.—**Hong Kong.**—Architectural Assistant for 3 years, with possible permanency, for the Government of Hong Kong. Salary £360–£10–£450, duty allowance of £40 per annum, and war bonus of 20 per cent. on salary and duty allowance. Crown Agents for the Colonies, 4, Millbank, S.W.1.

✱NO DATE.—**Portsmouth.**—Architectural Assistant experienced required in H.M. Dockyard, Superintending Civil Engineer, Portsmouth.

## PROPOSED NEW BUILDINGS AND OTHER WORKS.*

**In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C for Parish Council.**

BEXHILL.—Plans passed: Addition to 157, Station-road, by Mr. J. B. Wall, for Mr. H. J. Burnsted; house, De La Warr-road, by Mr. H. Ward, for Mr. W. Shannon; garage, "Fay Cottage," Beaulieu-road, Cooden, by Mr. F. B. Bending, for C. M. Harvey; additions, "The Retreat," Sutherland-avenue, by Mr. J. E. Maynard, for Mr. F. H. Hardman; house, Terminus-avenue, by Mr. J. E. Maynard, (or Miss M. Pocock; house, Hever-crescent, by Mr. J. E. Maynard, for Mr. F. B. Chandler; garage, St. John's Lodge, Collington-avenue, by Mr. G. H. Gray, for Miss Hamilton; cottage, Manor-road, by Mr. G. H. Gray, for Mrs. Hart; house, Hastings-road, by Mr. G. H. Gray, for Mrs. Burrows; schoolroom addition, Sandown School, Hastings-road, by Mr. G. H. Gray, for the Misses Neal and Cheffins; addition to club room, "Queen's Head" Hotel, Belle-hill, by Mr. J. B. Wall, for Messrs. Smith & Co.; house, Cooden-drive, by Mr. W. C. S. Styche, for Mr. W. Rapkin; forecourt enclosure, Wilton-court Hotel, Wilton-road, by Mr. G. H. Gray, for Mr. W. Meads; additions, "Heathcote," Little Common-road, by Mr. Stevens, for Mrs. Cotterill; shop front, 18, Western-road, by Mr. J. B. Wall, for Mr. T. Wallis; lock-up shop, 25, Sea-road, by Mr. G. H. Gray, for Mr. Arthur Chalk.

BOLTON.—Plans passed: Petrol store, Newnham-street, for Messrs. J. B. Scholes & Son; garage, Eagley Mills, for Messrs. J. Chadwick & Bros.; extension to card room, McKean-street, for Messrs. Winder and McKeen; additions, 38, Morris Green-lane, for Mr. Alfred Caldwell; Mr. F. Mayall, house, Victoria-road; William Gornall & Sons, Ltd., 2 houses, Albert-road West; Mr. E. Hornby, motor garage, 144, Markland-hill-lane; Mr. G. M. Hesketh, motor garage, "Lanercost," Albert-road; Mr. H. I. Cooper, motor garage, 184, Chorley New-road; Mr. A. Bickerstaffe, extension to coach-house, &c., Columbia-road; Mr. J. H. Green, petrol store, 106A, Great Moor-street; Taylor & Tomlinson, Ltd., alterations, 20, Bridge-street; Mr. S. Schofield, extension to bakehouse, 288, Halliwell-road; J. Marsden & Co., Ltd., store room, Burnden Bleach works; Wm. Townson & Sons, Ltd., petrol store, Park Hill-street; Grime & Glover, workshop, Charles-street; Mr. R. Kenyon, alterations to cottages, 40-52, Soho-street; Cannon Bros., Ltd., extension to Mill, Jackson-street; Mr. H. Beswick, alterations to premises, Churchgate; Bolton Co-operative Society, boot shop, Chorley Old-road, and for boot factory, Deane-road.

BRIDLINGTON.—Plans passed by T.C.: Messrs. W. S. Walker & Son, alterations, "Killarney House," Cardigan-road, for Mr. T. H. Buck; Mr. M. B. Parkin, two houses, Cardigan-road, for Mr. E. Gray; Messrs. Blackmore & Sykes, conversion of house into five flats, "Montpelier House," Albion-road, for Mrs. Fletcher; Messrs. Blackmore & Sykes, re-erection of house, shop, &c., in South Cliff-road, for Messrs. C. Gray & Co.; Messrs. Blackmore & Sykes, addition, "Polar Chalet," Marine-drive, for Mr. W. Buckley; Messrs. Waite & Vaux, alterations, the Amusement Centre, Promenade, for Messrs. Gadsby, Son, Waite & De Grey; Mr. J. R. Earnshaw, alterations, 18, Flamborough-road, for Mr. A. Walton; Mr. J. R. Earnshaw, additions, Norman House, St. Anne's-road, for Mr. C. Harland; Messrs. T. E. Davidson & Son, addition, 2, Carlton-street, for Mr. G. Holt; Mr. J. R. Earnshaw, three houses, Elma-avenue, for Mr. F. W. Martindale; Mr. J. R. Earnshaw, store room, Moorfield-road, for Mr. T. A. Moore; Mr. M. B. Parkin, alterations, Prospect-street, for Mr. A. J. Sigsworth; Messrs. Waite & Vaux, additions, 7, Flamborough-road, for Mr. J. J. Coleman; Mr. J. R. Earnshaw, alterations, 7, King-street, for Carlton's, Ltd.; Mr. J. R. Earnshaw, two houses, Cardigan-road, for Mr. F. W. Martindale; Messrs. Waite & Vaux, engineering works, Wycliffe-lane, for Mr. J. P. Nicholson; Mr. C. F. Johnson, addition of boiler house, laundry, Ferndale-terrace, for Mr. J. S. Hobson; Mr. C. F. Johnson, conversion of house into shop premises, 17, Neptune-terrace, for Mr. J. H. Brown; Mr. M. B. Parkin, alteration and additions, Emmanuel Parish Hall, Horsforth-avenue, for the Vicar and Churchwardens of Emmanuel Church; Mr. J. R. Earnshaw, motor garage, "Limpsfield," Cardigan-road, for Mr. R. Bailey.

CHELMSFORD: Plans passed: Alterations, 209, Moulsham-street, for Mr. E. C. Ashton; two cloak rooms, New-street Works, for the Hoffmann Manufacturing Co.; pair of houses, Swiss-avenue, for Mr. S. W. E. Stevenson; coal and boot house, Moulsham-street, for Mr. H. Gripper; additions, 61, London-road, for Mr. Godfrey Sykes; furniture store, Moulsham-street, for Mr. G. H. Gibson; petrol store, and filling shed, New-street, for Shell Marketing Co., Ltd.; petrol store, off Victoria-road, for the Anglo-American Oil Co., Ltd.; petrol store, Marconi-road, for the Marconi Wireless Telegraph Co., Ltd.

GLASGOW.—Linings granted in the Dean of Guild Court to the Corporation to form streets and sewers and erect 240 permanent and 126 temporary houses; the temporary buildings are all three-apartment houses, 112 situated in Springfield-road and 14 in Bartillon-drive, Govan; the site of the 240 houses in England's-drive and Moss-road, Greenhead, Govan—64 being houses of four apartments and 172 of three apartments. John Allan, 565, Cathcart-road, was authorised to erect three double villas at Fernleigh-road, Newlands. Albert E. Pickard, 101, Trongate, was granted a lining to erect a picture house in Dalmarnock-street and Dechmont-street, Parkhead; and another was passed to Smith & Welsh, 498, Alexandra-parade, to erect a picture house in Meadowpark-street. The Star Animated Pictures Co., Ltd., 121, West Regent-street, were authorised to alter and add to their building in Dumbarton-road, Partick; and Britannia Pictures, Ltd., 224, St. Vincent-street, to alter their building in Trongate. The following linings were also passed: Great Western Steam Laundry Co., Ltd., to add to buildings, Crow-road, Jordanhill; James Henderson & Co., 60, North-street, to erect a garage at 339, St. Vincent-street; Reid & Taylor, to erect a garage at 10, Barr-street, East; David & John Anderson, Ltd., Atlantic Mills, Bridgeton to add to their works in Walkinshaw-street; John Livingstone, building contractor, 37, Kelvin-street, to erect an office and workshop in North-street, Whiteinch; James M. Davidson, 33, East Clyde-street, to erect a fish-curing factory in Hospital and Thistle-streets; Cowlairs Bowling Club, to erect a clubhouse in Hill-street, Springburn; Thomas M'Stravick & Co., to erect a workshop and office in Firhill-road; Charles Springer & Sons, to add to their factory at 35, Buccleuch-street; Scottish Co-operative Wholesale Society, Ltd., 95, Morrison-street, to erect a preserve factory in Maxwell-road, Shieldhall; Bishop Campbell and others, for St. Serf's Church, South Chester-street, Shettleston, to erect a temporary church and hall there; and Robert Gibson, 102, Clarkton-road, to erect a garage at Merrylee-road, Cathcart.

GREENWICH.—Drainage plans passed by B.C.: At 39, Church-lane, Charlton; Mr. A. Dixon, for Messrs. Whitbread & Co.; at 4 & 6, Delacourt-road, by Messrs. Leslie & Co., for H.M. Office of Works.

ILKESTON.—Plans passed by T.C.: Garage, Drummond-road, for Mr. R. H. Starr; alterations, Nottingham-road, for Messrs. A. Godber & S. Turvey; lock-up shop, Alvenor-street, for Mr. F. Chas. Shaw; weigh house, off Rutland-street, for Mr. Wm. Stevens; St. Andrew's Mission Church, North-street, for the Rev. C. Leeper; dwelling house, Longfield-lane, for Mr. Sneap.

LEEDS.—The Theatres Committee has approved plans of picture theatre, two shops, &c., at Tong-road, Armley, for the Elite Picture Theatre (Leeds), Ltd.; picture house and café, Roundhay-road, for Mr. Barnet Caverson. Plans passed: Block of semi-detached houses, West Park-grove, for Messrs. C. H. & F. Lax; house, Gledhow-lane, for Mr. A. Hemingway; pair of semi-detached houses, Church-lane, Crossgates (Mr. G. Wilson).

PRESTON.—A Ministry of Health inquiry has been held into the petition by the County Council for a provisional order empowering the Council compulsorily to purchase certain property adjacent to the County Hall for extensions to the County offices.

STRATFORD-ON-AVON.—The Governors of the General Hospital have approved a scheme for enlarging the institution by increasing the ward area from 31 to 61 beds, by building a new out-patient department, and by improving the operating theatre and service departments at a cost of £26,250.

WOOLWICH.—The L.C.C. has given its consent to the B.C. borrowing £68,200 for housing purposes

### FIRES.

ANNFIELD PLAIN.—Damage to the extent of £50,000 was done by a fire which gutted the Dipton branch stores of the Annfield Plain Co-operative Society.

BRECHIN.—The Empire Picture House has been completely destroyed by fire. The proprietors are Messrs. Suttis & Buick.

PETERHEAD.—Damage estimated at about £1,000 has been caused by an outbreak of fire in the premises of Messrs. A. & F. Stephen, fish curer and barrel-makers, Windmill-street.

WATH-ON-DEARNE.—The Empire Picture Hall, owned by the West Riding Electric Theatres Co., has been completely destroyed by fire.

## TENDERS

**Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than first post on Wednesday.***

* Denotes *accepted*. † Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modifications*.

BARNSTAPLE.—Construction of roads and sewers, for the T.C.:—

*Newport Site.*

| | |
|---|---|
| *W. Slee & Son, Barnstaple .. | £4,937 5 11 |
| British Construction Co. .. | 5,094 3 3 |

*Stiklepath Site.*

| | |
|---|---|
| *W. Slee & Son .. .. | £5,734 18 6 |
| British Construction Co. .. | 6,030 9 1 |

BRIDLINGTON.—Private street works in Marine Drive, for the T.C.:—

| | |
|---|---|
| *Starkie & Co., Hull .. .. | £4,451 12 4 |

BRIDLINGTON.—Construction of dancing floor at the Spa, for the Corporation:—

| | |
|---|---|
| *T. A. Moore & Son .. .. | £625 10 6 |

BRISTOL.—New secondary school for boys, at Kingswood, near Bristol, for the Gloucestershire E.C. Mr. R. S. Phillips, Education Architect, Shire Hall, Gloucester:—

| | |
|---|---|
| Contract No. 1 (Foundations, brickwork, &c.):— | |
| *A. Jefferies & Son, Oldland.. .. | £7,300 |
| Contract No. 2— | |
| *A. Jefferies & Son. " .. .. | 9,950 |

* See also our List of Competitions, Contracts, &c.

# PRICES CURRENT OF MATERIALS.*

**[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.—Ed.]**

## BRICKS, &c.

| | | | | | | |
|---|---|---|---|---|---|---|
| Per 1,000 Alongside, in River Thames up to London Bridge. | | | | | £ | s. d. |
| Best Stocks | | | | | 4 | 15 0 |
| Per 1000, Delivered at London Goods Stations. | | | | | | |
| | £ | s. | d. | | £ | s. d. |
| Flettons | 3 | 2 | 6 | Best Blue Pressed Staffordshire | 9 | 11 0 |
| Best Stourbridge Fire bricks | 11 | 10 | 0 | Do. Bullnose | 9 | 13 6 |
| | | | | Blue Wire Cuts | 7 | 18 6 |
| GLAZED BRICKS— | | | | | | |
| Best White, Ivory, and Salt Glazed Stretchers | 24 | 0 | 0 | D'ble Str'tch'rs | 31 | 10 0 |
| | | | | D'ble Headers | 28 | 10 0 |
| Headers | 23 | 10 | 0 | One Side and two Ends | 32 | 10 0 |
| Quoins, Bullnose and 4½in. Flats | 29 | 10 | 0 | Two Sides and one End | 33 | 10 0 |
| | | | | Splays and Squints | 31 | 0 0 |

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

| | £ | s. | d. | | |
|---|---|---|---|---|---|
| Thames Ballast | 19 | 6 | | per yard. | delivered |
| Pit Sand | 23 | 6 | | | |
| Thames Sand | 25 | 6 | .. .. | 2 miles | |
| Best Washed Sand | 24 | 6 | .. .. | radius | |
| ½in. Shingle for Ferro-Concrete | 23 | 6 | .. .. | Paddington. | |
| ¼ in .. .. | 24 | 6 | .. .. | | |

Per ton, delivered in London area.

| | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Best Portland Cement | 3 | 18 | 6 | .. | 4 | 4 | 0 |

7½/6 munguse at Vauxhall in 80-ton lots.
Ferrocrete per ton extra on above. .. .. 5 0
Best Ground Blue Lias Lime 2 16 0 at rly. depot.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. The sacks are charged at 2s. 6d. each and credited at 2s. each if returned in good condition within three months.

Grey Stone Lime .... 61s. 0d. per ton delivered.
Stourbridge Fireclay in s'cks 43s. 6d. per ton at rly. dpt.

## STONE.

| | s. | d. |
|---|---|---|
| BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube | 2 | 2½ |
| Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube | 2 | 4 |
| Do. do. delivered on road waggons at Nine Elms Depot | 2 | 5 |
| PORTLAND STONE— | | |
| Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Milcage Station G.W.R., per ft. cube | 4 | 3 |
| Do. do. delivered on road waggons at above stations, per ft. cube | 4 | 4 |
| White basebed, 3d. per ft. cube extra. | | |
| NOTE.—½d ft. cube extra for every foot over 30 ft. *average*, and ½d. beyond 30 ft. | | |
| YORK STONE, BLUE—*Robin Hood Quality.* Delivered at any Goods Station London. | s. | d. |
| Scappled random blocks ..... Per Ft. Cube | 11 | 9 |
| 6 in. sawn two sides landings to sizes (under 30 ft. super.) ..... Per Ft. Super | 8 | 1½ |
| 6 in. rubbed two sides, ditto ..... " | 9 | 1½ |
| 9 in. sawn two sides slabs (random sizes) " | 5 | 7½ |
| 2 in. to 2½ in. sawn one side slabs (random sizes) ..... " | 2 | 2 |
| 1½ in. to 2 in. ditto, ditto ..... " | 1 | 10 |
| HARD YORK— Delivered at any Goods Station London. | | |
| Scappled random blocks ..... Per Ft. Cube | 8 | 9 |
| 6 in. sawn two sides landing to sizes (under 40ft. super.) ..... Per Ft. Super | 7 | 0 |
| 6 in. rubbed two sides ditto ..... " | 8 | 3 |
| 4 in. sawn two sides slabs (random sizes) " | 3 | 3 |
| 3 in. ditto, ditto " | 4 | 4 |
| 2 in. self-faced random flags .. Per Yard Super | 10 | 6 |

## WOOD.

### GOOD BUILDING DEAL.

| Inches | £ | s. | |
|---|---|---|---|
| 6 x 11 | 60 | 0 | per standard |
| 4 x 9 | 48 | 0 | " |
| 4 x 8 | 46 | 5 | " |
| 4 x 7 | 46 | 0 | " |
| 3 x 8 | 46 | 0 | " |
| 3 x 7 | 46 | 0 | " |
| 2½ x 7 | 46 | 0 | " |
| 3 x 6 | 45 | 0 | " |
| 3 x 11 | 60 | 0 | " |
| 2 x 11 | 60 | 0 | " |
| 3 x 9 | 52 | 0 | " |
| 3 x 9 | 52 | 0 | " |
| 3 x 4½ | 45 | 0 | " |
| 3 x 4 | 45 | 0 | " |

### PLANED BOARDS.

| | | | |
|---|---|---|---|
| 1 x 11 | 65 | 0 | |
| 1 x 9 | 50 | 0 | " |

### PLAIN EDGE FLOORING.

| Inches | | |
|---|---|---|
| ½ | 34/- | square |
| ⅝ | 40/- | " |
| 1 | 44/- | " |
| 1¼ | 55/- | " |
| 1½ | 65/- | " |

### TONGUED AND GROOVED FLOORING.

| Inches | | |
|---|---|---|
| 1 | 45/6 | square |
| 1¼ | 56/6 | " |
| 1½ | 66/6 | " |

## WOOD (*Continued*).

### MATCHINGS (BEST).

| Inches | | |
|---|---|---|
| ½ | 34/- | square |
| ⅝ | 40/- | " |
| 1 | 54/- | " |

### BATTENS.

| Inches | £ | s. | |
|---|---|---|---|
| ½ x 2 | 39 | 10 | per standard |

### SAWN LATHS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Per bundle | | | | | | | — |
| Dry Wainscot Oak, per ft. super, as inch | 0 | 2 | 6 | to | 0 | 3 | 0 |
| ½ in. do. do. | 0 | 2 | 0 | to | 0 | 2 | 6 |
| Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch | 0 | 2 | 6 | to | 0 | 3 | 0 |
| Cuba, Mahogany | 0 | 3 | 6 | to | 0 | 4 | 0 |
| Teak (Rangoon, Moulmein or Java), per load | 60 | 0 | 0 | to | 85 | 0 | 0 |
| American Whitewood planks, per ft. cube | 0 | 18 | 0 | to | 1 | 0 | 0 |
| Scotch Glue, per cwt. | 5 | 5 | 0 | .. | | | — |
| Liquid Glue, per gallon | 0 | 17 | 0 | .. | | | — |

## SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

| | | £ | s. | d. |
|---|---|---|---|---|
| Best Blue Bangor Slates, | 24 by 12 | 55 | 0 | 0 |
| " " " | 22 by 12 | 44 | 7 | 6 |
| First quality " | 22 by 11 | 40 | 15 | 0 |
| " " | 20 by 12 | 40 | 7 | 6 |
| Best Blue Portmadoc | 20 by 10 | 35 | 0 | 0 |
| " " | 18 by 10 | 27 | 17 | 6 |
| First quality " | 18 by 9 | 22 | 15 | 0 |
| " " | 16 by 10 | 21 | 10 | 0 |
| " " | 16 by 8 | 16 | 17 | 6 |

## TILES.

| | Per 1,000 f.o.r. London. | | |
|---|---|---|---|
| | £ | s. | d. |
| Best machine-made tiles from Broseley or Staffordshire district | 6 | 15 | 0 |
| Ditto hand-made ditto | 7 | 0 | 0 |
| Ornamental ditto | 7 | 2 | 6 |
| Hip and valley tiles (per dozen) | 0 | 15 | 0 |

## METALS.

JOISTS, GIRDERS, &C., TO LONDON STATION PER TON—

| | £ | s. | d. |
|---|---|---|---|
| R. S. Joists, cut and fitted | 30 | 0 | 0 |
| Plain Compound Girders | 32 | 0 | 0 |
| " Stanchions | 34 | 0 | 0 |
| In Roof Work | 30 | 0 | 0 |

WROUGHT-IRON TUBES AND FITTINGS—
(Discount off List for lot of not less than £10 net value delivered direct from works. 5 per cent. less carriage forward if sent from London stocks.)

| | Sizes up to and including 2 in. Tubes. | Fittings. | Sizes 2½ in. to 6 in. Tubes. | Fittings. |
|---|---|---|---|---|
| Gas | 10 | 12½ | 12½ | 5 |
| Water | 1½ | 7½ | 5 | 22½ |
| Steam | +8½ | —2½ | + ½ | —2 |
| Galvanised Gas | +15 | —2½ | +12½ | —15 |
| " Water | +26½ | +2½ | +22½ | —17½ |
| " Steam | +37½ | +7½ | +32½ | —10 |

L.C.C. COATED SOIL PIPES—London Prices ex works.

| | Pipe. | Bends, stock angles. | Branches, stock angles. |
|---|---|---|---|
| | s. d. | s. d. | s. d. |
| 2 in. per yd. in 6 fts. | 5 6 | 4 0 | 4 [illegible] |
| 2½ in. " " | 6 8 | 4 5 | 6 0 |
| 3 in. " " | 8 1 | 4 19 | 7 3 |
| 3½ in. " " | 9 0 | 6 0 | 8 5 |
| 4 in. " " | 9 6 | 6 10 | 9 8 |

RAIN-WATER PIPES, &C.

| | Pipe. | Bends, stock angles. | Branches, stock angles. |
|---|---|---|---|
| | s. d. | s. d. | s. d. |
| 2 in. per yd. in 6fts. plain | 4 0 | 2 3 | 3 0 |
| 2½ in. " " | 4 6 | 2 8 | 3 8 |
| 3 in. " " | 5 6 | 3 3 | 4 10 |
| 3½ in. " " | 6 6 | 3 10 | 5 8 |
| 4 in. " " | 6 9 | 4 8 | 6 10 |

L.C.C. DRAIN PIPES.—9 ft. lengths. London Prices. 4 in., 12s. .. 5 in., 15s. .. 6 in., 18s.

| IRON— | Per ton in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Common Bars | 32 | 0 | 0 | to | 33 | 0 | 0 |
| Staffordshire Crown Bars good merchant quality | 33 | 0 | 0 | .. | 34 | 0 | 0 |
| Staffordshire "Marked Bars" | 34 | 0 | 0 | .. | 35 | 0 | 0 |
| Mild Steel Bars | 34 | 0 | 0 | .. | 35 | 0 | 0 |
| Steel Bars, Ferro-Concrete quality, basis price | 34 | 0 | 0 | .. | 35 | 0 | 0 |
| Hoop Iron, basis price | 38 | 0 | 0 | .. | 40 | 0 | 0 |
| " " Galvanised | 56 | 0 | 0 | .. | 60 | 0 | 0 |
| Sheet Iron Black— | | | | | | | |
| Ordinary sizes to 20 g. | 48 | 0 | 0 | .. | 50 | 0 | 0 |
| " " 24 g. | 49 | 0 | 0 | .. | 51 | 0 | 0 |
| " " 26 g. | 51 | 0 | 0 | .. | 53 | 0 | 0 |
| Sheet iron, Galvanised flat, ordinary quality— | | | | | | | |
| Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 56 | 0 | 0 | .. | 58 | 0 | 0 |
| Ordinary sizes to 22 g. and 24 g. | 57 | 0 | 0 | .. | 59 | 0 | 0 |
| Ordinary sizes to 26 g. | 59 | 0 | 0 | .. | 60 | 0 | 0 |
| Ordinary sizes to 20 g. " " 22 g. and 24 g. | 56 | 0 | 0 | .. | 58 | 0 | 0 |
| | 57 | 0 | 0 | .. | 59 | 0 | 0 |
| Ordinary sizes to 26 g. | 59 | 0 | 0 | .. | 60 | 0 | 0 |

## METALS (*Continued*).

| | Per ton in London. £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|
| Galvanised Corrugated Sheets— | | | | | | | |
| Ordinary sizes, 6 ft. to 8 ft. 20 g. | 58 | 0 | 0 | .. | 60 | 0 | 0 |
| Ordinary sizes, 22 g. and 24 g. | 59 | 0 | 0 | .. | 61 | 0 | 0 |
| Ordinary sizes, 26 g. | 60 | 0 | 0 | .. | 63 | 0 | 0 |
| Sheet iron, Galvanised, flat, best quality— | | | | | | | |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker | 58 | 0 | 0 | .. | 60 | 0 | 0 |
| Best Soft Steel Sheets, 22 g. and 24 g. | 59 | 0 | 0 | .. | 61 | 0 | 0 |
| Best Soft Steel Sheets, 26 g. | 61 | 0 | 0 | .. | 62 | 0 | 0 |
| Cut Nails, 3 in. to 6 in. | 44 | 10 | 0 | .. | 45 | 0 | 0 |

(Under 3 in. usual trade extras.)

## LEAD, &c.

| | Delivered in London. £ | s. | d. | | |
|---|---|---|---|---|---|
| LEAD Sheet, English, 4 lb. and up | 57 | 0 | 0 | .. | — |
| Pipe in coils | 57 | 10 | 0 | .. | — |
| Soil Pipe | 60 | 0 | 0 | .. | — |
| Compo pipe | 61 | 0 | 0 | .. | — |
| NOTE—Country delivery, 30s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 2s. cwt. extra. | | | | | |
| Old lead, ex London area, at Mills ..... per ton | 37 | 0 | 0 | .. | — |
| Do., ex country, carriage forward ..... per ton | 38 | 0 | 0 | .. | — |
| COPPER— | | | | | |
| Strong Sheet .... per lb. | 0 | 2 | 3 | .. | — |
| Thin " .... " | 0 | 2 | 4 | .. | — |
| Copper nails .... " | 0 | 2 | 3 | .. | — |
| Copper wire .... " | 0 | 2 | 4 | .. | — |
| TIN—English Ingots " | 0 | 3 | 6 | .. | — |
| SOLDER—Plumbers' " | 0 | 1 | 10 | .. | — |
| Tinmen's " | 0 | 2 | 6 | .. | — |
| Blowpipe " | 0 | 2 | 11 | .. | — |

## GLASS

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

| | Per Ft. | | Per Ft. |
|---|---|---|---|
| 15 oz. fourths .... | 8d. | 32 oz. fourths .... | 11d. |
| " thirds .... | 8½d. | " thirds .... | 1/- |
| 21 " fourths .... | 9d. | Fluted, Obscured and | |
| " thirds .... | 9½d. | Enamelled Sheet. | |
| 26 " fourths .. | 10d. | 15 oz. | 10d. |
| " thirds .... | 11d. | 21 " | 1/- |

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

| | Per Ft. |
|---|---|
| ⅛ Rolled plate | 6½d. |
| ⅛ Rough rolled and rough cast plate | 7½d. |
| ¼ Rough rolled and rough cast plate | 8½d. |
| Figured Rolled, Oxford Rolled, Baltic, Oceanic Arctic, Stippolyte, and small and large Flemish white | 7½d. |
| Ditto, tinted | 9½d. |
| Rolled Sheet | 7d. |
| White Rolled Cathedral | 7d. |
| Tinted do. | 9d. |

## PAINTS, &c.

| | | £ | s. | d. |
|---|---|---|---|---|
| Raw Linseed Oil in pipes ..... per gallon | | 0 | 10 | 10 |
| " " " in barrels .... " | | 0 | 11 | 0 |
| " " " in drums .... " | | 0 | 11 | 3 |
| Boiled " " in barrels .... " | | 0 | 11 | 6 |
| " " " in drums .... " | | 0 | 11 | 9 |
| Turpentine in barrels .... " | | 0 | 10 | 1 |
| " in drums (10 gall.) .. " | | 0 | 10 | 7 |
| Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.) | | 90 | 15 | |
| GENUINE WHITE LEAD PAINT— "Nine Elms," "Park," "Supremus," and other best brands (in 14 lb. tins) not less than 5 cwt. lots .. per ton delivered | | 119 | 10 | 0 |
| Red Lead, Dry (packages extra) .. per ton | | 60 | 0 | 0 |
| Best Linseed Oil Putty ..... per cwt. | | 1 | 14 | 3 |
| Filocol ..... per cwt. | | 0 | 18 | 0 |
| Size. X D Quality ..... fkn. | | 0 | 6 | 6 |

## VARNISHES, &c.

| | Per gallon. £ | s. | d. |
|---|---|---|---|
| Oak Varnish ..... Outside | 0 | 18 | 0 |
| Fine ditto ..... ditto | 1 | 0 | 0 |
| Fine Copal ..... ditto | 1 | 1 | 6 |
| Pale Copal ..... ditto | 1 | 2 | 6 |
| Pale Copal Carriage ..... ditto | 1 | 4 | 6 |
| Best ditto ..... ditto | 1 | 14 | 6 |
| Floor Varnish ..... Inside | 0 | 19 | 6 |
| Fine Pale Paper ..... ditto | 0 | 18 | 0 |
| Fine Copal Cabinet ..... ditto | 1 | 2 | 6 |
| Fine Copal flatting ..... ditto | 1 | 0 | 6 |
| Hard drying Oak ..... ditto | 0 | 18 | 0 |
| Fine Hard drying Oak ..... ditto | 0 | 19 | 0 |
| Fine Copal Varnish ..... ditto | 1 | 0 | 6 |
| Pale ditto ..... ditto | 1 | 2 | 6 |
| Best ditto ..... ditto | 1 | 14 | 6 |
| Best Japan Gold Size ..... | 0 | 16 | 0 |
| Best Black Japan ..... | 0 | 19 | 0 |
| Oak and Mahogany Stain (water) .... .. | 0 | 10 | 0 |
| Brunswick Black ..... | 0 | 11 | 0 |
| Berlin Black ..... | 0 | 16 | 0 |
| Knotting (patent) ..... | 1 | 19 | 6 |
| French and Brush Polish ..... | 1 | 11 | 0 |
| Liquid Dryers in Terebine ..... | 0 | 19 | 0 |
| Cuirass Black Enamel ..... | 0 | 7 | 6 |

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

CHELMSFORD.—Supply of tar for one year, to the T.C. :—

| | Price per gall. s. d. |
|---|---|
| *W. B. King & Co., Ltd., Ipswich .. | 9½ |
| R. S. Clare & Co., Ltd., Liverpool .. | 1 5 |
| Bristowe & Co., Ltd., Westminster, S.W. | 10½ |

CHELMSFORD.—Painting gasholders at Gasworks, for the T.C. :—

| | |
|---|---|
| *W. G. Beaumont & Son, Bow .. | £170 0 |
| J. G. Blakeway, Manchester .. | 450 0 |
| Pickles, Ayland & Co., Ltd., Westminster .. .. | 384 0 |
| G. H. Miller & Co., Forest Gate .. | 317 2 |
| J. & P. Zammit, Llanelly .. .. | 244 10 |

CIRENCESTER.—Extensions to Cirencester Grammar School, for the E.C. Mr. R. S. Phillips, Education Architect, Shire Hall, Gloucester :—

Contract No. 1 (New heating chamber, changing room, &c.)—

| | |
|---|---|
| *W. G. Tannar, Cirencester .. .. | £465 10 |

Contract No. 2 (Superstructure)—

| | |
|---|---|
| *Humphreys, Ltd., London .. .. | 3,137 0 |

DUMBARTON.—For various trades for the housing scheme, for the T.C. Mr. W. A. Macartney, Borough Engineer, Dumbarton. Quantities by Mr. J. H. Allan, F.F.S., Glasgow :—

| | |
|---|---|
| James Crawford, Glasgow, mason's work .. | £8,312 7 10 |
| Alex. McCrae, Cardross, joiner's work .. | 4,714 0 2 |
| Robert Chambers, Dumbarton, glazier's work .. | 79 18 10 |
| P. White & Co., Glasgow, slater's work .. | 1,232 5 8 |
| Kilpatrick & Bremner, Dumbarton, plumber's work .. | 1,757 16 1 |
| Dumbarton Gas Dept., Dumbarton, gasfitting work .. | 335 8 0 |
| Robert Devlin, Dumbarton, plaster work .. | 1,269 6 6 |
| James Kincaid, Dumbarton, painter's work .. | 449 14 10 |

ETON.—For re-surfacing carriage way in High-street, for the U.D.C. Mr. J. E. Hattersley, Engineer and Surveyor to the Council.

| | |
|---|---|
| Tarmac, Ltd., Wolverhampton | £1,356 5 0 |
| Wm. Shepherd & Sons, Ltd., Rochdale .. | 1,210 8 4 |
| Redford, Tebbs & Co., Ltd., Derby .. | 816 3 6 |

GLASGOW.—For (*a*) street construction at Kennyhill and Riddrie Area, No. 2, and (*b*) at Greenhead housing site, for the T.C. :—

| | |
|---|---|
| *(*a*) Isaac Craik .. .. .. | £36,785 0 |
| *(*b*) Stark & Son .. .. .. | 15,371 3 |

HORSHAM.—For carrying out second portion of Oakhill housing scheme, for the U.D.C. :—

| | |
|---|---|
| Rowland Bros., 18 cottages "B" type | £779 |
| G. Potter, 10 cottages "A" type .. | 745 |
| Head & Taylor, 4 cottages "A" type | 756 |

(Submitted to Housing Commissioners.)

LEEDS.—For works at Hunslet Baths, for the Corporation :—

| | |
|---|---|
| *Clayton, Son & Co., Ltd., for boiler and fittings .. | £1,592 0 0 |
| *Tunstalls' Seyssel & Limmer Rock Asphalte Co., Ltd., for re-lining (asphalt) to the 1st Class Swimming Bath .. .. .. | 264 15 6 |
| *William Simpkiss, for re-lining (brickwork) to the 1st Class Swimming Bath .. | 1,082 0 0 |

LEEDS.—For painting, &c., at Police Buildings, &c., for the T.C. :—

| | |
|---|---|
| *W. H. Pitts, Millgarth-street and Cross Gates .. .. .. | £126 7 0 |
| *Ditto, Marsh-lane, York-road, East-street and Hunslet .. | 133 18 6 |
| Ditto, Police Offices, Town Hall and Municipal Buildings .. | 95 5 0 |
| H. Whitaker, Dewsbury-road, Holbeck and Beeston Police Stations .. .. .. | 100 1 0 |
| Ditto, Meadow-lane Police Station and Dogs' Homes .. .. | 49 7 0 |
| Kendall & Co., Kirkstall, New Wortley and Kirkstall-road Police stations .. .. | 80 19 0 |
| Ditto, Armley, Upper Wortley, Farnley and Bramley Police Stations .. .. .. | 89 13 0 |
| L. E. Wilkinson, Ashley-road, Chapeltown and Roundhay Police Stations .. .. | 79 9 6 |
| Ditto, Woodhouse and Headingley Police Stations and House of Detention, Clarendon-road .. .. .. | 106 0 6 |
| Ditto, interiors of Firemen's Houses in Park-street and the Mounted Detachment Parade Room, &c. .. .. | 151 17 0 |
| Ditto, interior of Firemen's Houses in Park-street, Chariot Houses in Park-street, Chariot-street and Oxford-yard .. .. .. .. | 157 7 0 |
| H. Shann, exterior of building occupied by firemen, adjoining Central Fire Station, Park-street .. .. .. | 100 10 0 |

LEWISHAM.—For erection of 26 "B" houses and one "B4" house, comprising the third and fourth sections of the Lewisham Park housing scheme, for the B.C. :—

| | |
|---|---|
| *Harry Groves & Son, Greenwich .. .. .. | £32,798 10 9 |
| W. J. Scudamore & Sons, Lee | 32,890 11 6 |
| H. Kent, Hither Green .. | 34,876 14 1 |
| Ambrose Shore .. .. | 35,400 9 0 |
| Sabey & Son, Islington .. | 36,841 0 0 |
| F. W. Loasby, Hither Green | 41,633 1 4 |

OLDBURY.—For erection of 86 houses, for the U.D.C. Mr. Roland Fletcher, A.M.Inst.C.E., Public Buildings, Oldbury :—

Plan L 5, Type A.

| | |
|---|---|
| J. Harper & Sons, B'ham. .. | £866 10 |

Plan P 3, Type B.

| | |
|---|---|
| H. Swain, B'ham .. | 921 10 |
| Rowley and Bridge .. | 921 10 |
| D. McWhirter, B'ham. .. | 921 10 |
| Housing, Ltd., B'ham .. | 921 10 |

These are "basis prices" at which the builders have agreed to erect houses.

ST. MARYLEBONE.—For alterations at the Workhouses in Northumberland-street, W., for the Guardians. Mr. A. Saxon Snell, F.R.I.B.A., architect, 9, Bentinck-street, W.1 :—

| | |
|---|---|
| *H. Meckhonik, Upper Berkeley-street, W. .. .. .. .. | £335 |

Re-drainage at Nos. 1a and 4, Northumberland-street—

| | |
|---|---|
| *T. Press & Co., Edgware-road, W. .. | 286 |


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